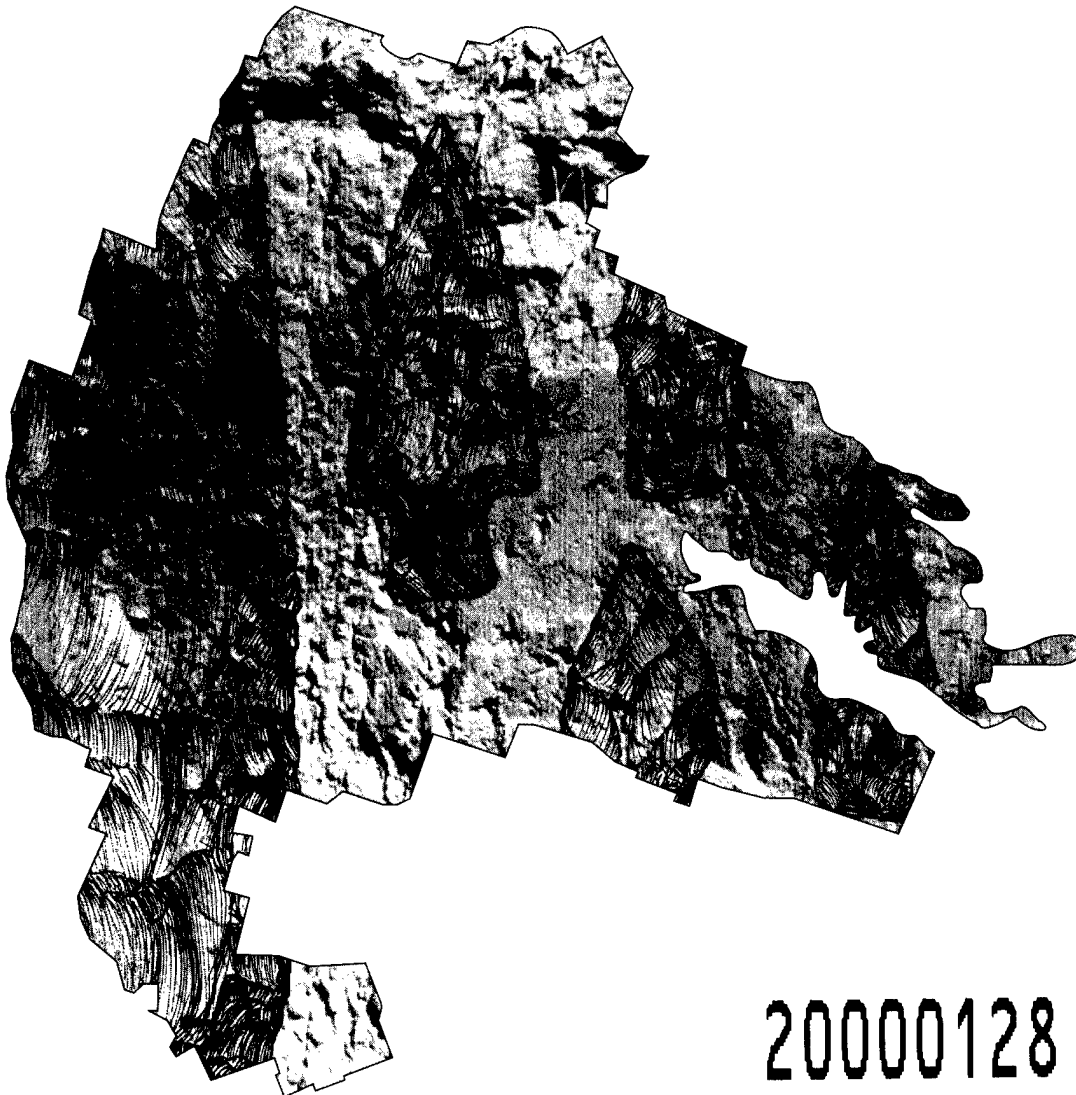


**NATIONAL REGISTER TESTING OF 42 PREHISTORIC  
ARCHEOLOGICAL SITES ON FORT HOOD, TEXAS:  
THE 1996 SEASON**

by  
**Karl Kleinbach  
Gemma Mehalchick  
Douglas K. Boyd  
and  
Karl W. Kibler**



**20000128 073**

**United States Army Fort Hood  
Archeological Resource Management Series  
Research Report No. 38**

1999



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with Contributions by

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Prepared for

Directorate of Public Works  
Environmental Management Office  
Fort Hood

by

Prewitt and Associates, Inc.  
Cultural Resources Services  
Austin, Texas

in partial fulfillment of  
Contract DAKF48-95-D-0004  
Delivery Orders 3, 4, and 6

December 1999

## REPORT DOCUMENTATION PAGE

Form Approved  
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE <b>Dec</b> <del>July</del> 1999	3. REPORT TYPE AND DATES COVERED Final Report	
4. TITLE AND SUBTITLE National Register Testing of 42 Prehistoric Archeological Sites on Fort Hood, Texas: The 1996 Season.			5. FUNDING NUMBERS  DAKF48-95-D-0004 Delivery Orders 0003, 0004, 0006	
6. AUTHOR(S)  Karl Kleinbach, Gemma Mehalchick, Douglas K. Boyd, and Karl W. Kibler				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)  Prewitt and Associates, Inc. 7701 North Lamar, Suite 104 Austin, TX 78752-1012			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)  Department of the Army-Fort Hood Department of Public Works Environmental Management Office, Bldg 4249 Fort Hood, Texas 77594			10. SPONSORING/MONITORING AGENCY REPORT NUMBER  Archeological Resource Management Series, Research Report No. 38	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION AVAILABILITY STATEMENT  Available for public release			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words)  National Register testing was conducted at 42 sites on Fort Hood, Texas, in 1996 by Prewitt and Associates, Inc. All are open campsites and are grouped by geomorphic setting or geographic location as follows: Paluxy sites (n = 14), House-Ripstein Creek sites (n = 15), Cowhouse-Table Rock-Cottonwood Creek sites (n = 8), and other sites (n = 5). Intact buried cultural components that are recommended as eligible for listing in the National Register of Historic Places were identified at 20 of these sites. Chronology of the identified occupation zones is established based on 62 radiocarbon dates; 45 of these were on cultural features.				
14. SUBJECT TERMS  Archeology, Fort Hood, Texas, prehistory, National Register of Historic Places, historic preservation, burned rock midden, rockshelter			15. NUMBER OF PAGES 591	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT Unclassified	

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## **EXECUTIVE SUMMARY**

### **WHAT IS THIS REPORT?**

This report was prepared by Prewitt and Associates, Inc., of Austin, Texas, for the Directorate of Public Works, Environmental Management Office, Fort Hood. The work was completed in compliance with Fort Hood's Historic Preservation Plan. Archeological testing and assessments of 42 prehistoric sites on Fort Hood are reported.

### **WHAT WORK WAS DONE?**

Archeological testing of 42 sites was done to evaluate their eligibility for listing in the National Register of Historic Places (NRHP). Mechanical and/or hand excavations at each site obtained data that were then compared with the significance standards previously defined for NRHP-eligible sites at Fort Hood. Mechanical excavations were done with a backhoe, and hand excavations used standard archeological units (usually 1 x 1 m or 50 x 50 cm) and arbitrary levels (10 cm). One hundred forty backhoe trenches and 188 test units were excavated, 14,211 artifacts were recovered, and 74 features were investigated. In addition to evaluating site significance, the archeological evidence was used to identify the time frame of prehistoric occupations and to interpret the types of human activities involved.

### **WHAT ARE THE RESULTS?**

Each of the 42 tested sites was evaluated relative to established criteria for National Register eligibility. Of these, 20 sites were found to have intact buried cultural deposits and are recommended as eligible for listing in the NRHP. The other 22 sites are recommended as not eligible for listing in the NRHP.

### **WHAT ARE FORT HOOD'S RESPONSIBILITIES?**

Upon concurrence by the State Historic Preservation Officer, no further management is required for the ineligible sites. The United States Army is responsible for continued management of all of the NRHP-eligible sites, which means that these sites must be preserved and protected. For NRHP-eligible sites that cannot be protected from current or future impacts, the adverse effects of these impacts must be mitigated through archeological data recovery.

## ABSTRACT

National Register testing was conducted at 42 sites on Fort Hood, Texas, in 1996 by Prewitt and Associates, Inc. All are open campsites and are grouped by geomorphic setting or geographic location as follows: Paluxy sites (n = 14), House-Ripstein Creek sites (n = 15), Cowhouse-Table Rock-Cottonwood Creek sites (n = 8), and other sites (n = 5). Intact buried cultural components that are recommended as eligible for listing in the National Register of Historic Places were identified at 20 of these sites. Chronology of the identified occupation zones is established based on 62 radiocarbon dates; 45 of these were on cultural features.

Investigations at the Paluxy sites include a detailed geomorphic study and sedimentological analyses aimed at defining site formation processes in the Paluxy environment. Twelve radiocarbon dates from the 14 tested Paluxy sites, along with 19 radiocarbon dates from Paluxy sites previously tested by TRC Mariah Associates, Inc. are synthesized. The evidence demonstrates that occupation episodes at Paluxy sites are commonly Late Archaic and Late Prehistoric in age. The relative paucity of evidence of earlier occupations appears to reflect a geomorphic bias, with older sediments having been eroded away as the Paluxy sand-bearing slopes retreated through time. Two burned rock mounds and one midden were tested. Relatively good preservation of charred organic remains was found in sediment samples associated with some features, and a 1,280-year-old hearth at 41CV988 yielded charred plant fragments that may represent an edible underground storage root.

Evidence of intensive Middle Archaic to Late Prehistoric occupations was found at sites along House and Ripstein Creeks. Six burned rock middens and one mound were tested; three (at sites 41CV1211, 41CV1235, and 41CV1269) were found to have accreted during the Middle and/or Late Archaic periods. One burned rock midden (at 41CV1269) is a Late Prehistoric feature and possibly accumulated during the Toyah phase. Evidence of stratified or otherwise separable cultural occupations was encountered at sites 41CV1191, 41CV1250, 41CV1235, and 41CV1269. Excavations at 41CV1286 revealed a discrete short-term Toyah phase occupation and produced an interesting assemblage of unifacial scrapers and expedient tools. An unusual assemblage of dart points, herein called Provisional Type 1, was recovered from several sites (41CV1191, 41CV1221, 41CV1235, 41CV1269, and 41CV1286) along House and Ripstein Creeks. Several of these specimens are from well-dated stratigraphic contexts and appear to have been in use between approximately 4000 and 3300 B.P. Provisional Type 1 points are similar to, yet distinct from, Bulverde points, and similar specimens have been recovered from Middle Archaic contexts at other Central Texas sites.

Several Cowhouse-Table Rock-Cottonwood Creek sites also produced evidence of discrete and/or stratified cultural occupations dating from the Middle Archaic to the Late Prehistoric, as did one of the other sites. Five burned rock middens were tested at four of the Cowhouse-Table Rock-Cottonwood Creek and other sites (41CV1048, 41CV1092, 41CV1122, and 41CV1133). A relatively high concentration of mussel shells, presumably collected as food, was observed at sites along Table Rock Creek.

In conjunction with the testing of sites on House and Ripstein Creeks, samples of naturally occurring chert from local outcrops were collected and classified according to the established Fort Hood chert typology. Each sample was analyzed by several different researchers to test the replicability of the chert classification scheme, and some of the inferences derived from these studies have important implications for refining the chert taxonomy. Researchers found a high rate of error in distinguishing between some chert types, while others were easily and consistently recognizable. Several specimens of Heiner Lake Blue, a chert type thought to occur only in the Southeast Range province, were identified in the chert samples from the western portion of Fort Hood.

## ACKNOWLEDGMENTS

Most of the work done by Prewitt and Associates was coordinated by Fort Hood archeologist Dr. Jack Jackson, until he passed away in October 1996. Dr. Kimball Smith began to take over the Fort Hood Archeological Resources Management Program a few months prior to Jack's death, and he has guided the program through this difficult transition period. While Jack's efforts laid the groundwork for the research reported here, the remainder of the oversight of this work fell to Kimball. Both of their efforts are appreciated.

Several other Fort Hood personnel helped us coordinate and conduct our fieldwork, and their efforts also are appreciated. Bill Roberts, James Conors, and Larry Pullman with Fort Hood DEH, Maintenance Division, coordinated our fieldwork schedule and the scheduling of the backhoe. Lester Duncan operated the backhoe in his ever-efficient manner. Fort Hood Senior Field Botanist Laura Sanchez assisted us by identifying the spring and summer plants growing on Paluxy sites. Gil Eckrich, John Cornelius, and Billy Ray (B.R.) Jones of the DEH, Environmental Management Office, Natural Resources Branch, coordinated our work in all areas where endangered species habitat, caves, or sinks are present. Training Area Access and G3 Range Control issued vehicle permits and coordinated our field schedules. Larry Ximenez with Range Control was particularly helpful in guiding us through the maze of Army regulations.

Bill Martin and Herb Uecker served as project reviewers for the Archeology Division of the Texas Historical Commission. Former Mariah Associates employees Jim Abbott and Lain Ellis have both served as occasional informal consultants and provided advice and interesting archeological discussions. Jim Abbott and Margaret Howard both served as peer reviewers for this report.

Douglas K. Boyd served as Project Manager and Co-Principal Investigator, and was the primary editor of this report. Elton R. Prewitt also served as Co-Principal Investigator and helped keep the project on track. Ross Fields served as Quality Control Officer and made frequent inspections to insure that the archeological work was being done properly in the field and laboratory. The fieldwork, analysis, and report preparation were directed by Project Archeologists Gemma Mehalchick and Karl Kleinbach, with Kleinbach taking the lead role. Their superb knowledge of the archeology of Fort Hood was a tremendous asset to the project. Karl W. Kibler served as the Project Geomorphologist. Crews members included Roman Clem, Shawn Capehart, Cullom, Mark Holderby, Jon Geiselbrecht, Kyle Killian, Don Lloyd, Todd Seacat, Russ Shortes, David Soldo, and Brandon Young. Consultants who contributed to the data analysis are interpretations are Barry Baker (analysis of faunal remains), Phil Dering (analysis of macrobotanical remains), and Gavin Hudgeons (analysis of Paluxy site sediments).

Daily operations were coordinated by Jeanine Cuellar, Business Manager and Bookkeeper. Laboratory work was conducted and supervised by Laboratory Director Karen Gardner and Laboratory Assistant Audra Pineda. They both did an admirable job of compiling and keeping track of all of the various computerized provenience and artifact databases for the analysis phase. This report was edited and produced by Editor Melissa Hennigan and the figures were drafted by Assistant Cartographer Brian Wootan.

# INTRODUCTION

*Douglas K. Boyd*

1

The Fort Hood military reservation (Figure 1), a 339.6-mi<sup>2</sup> (217,337 acres) area of Bell and Coryell Counties, Texas, has been the scene of intensive archeological investigations since the late 1970s. This report documents the most recent archeological investigations completed as part of Fort Hood's ongoing Cultural Resources Management Program.

Following regulations (36 CFR 800) of the National Historic Preservation Act [16 U.S.C. 470(f) and 470h-2(f)] of 1966 (as amended), Fort Hood has been engaged in a program of inventorying and evaluating its cultural resources to determine the eligibility of historic properties for listing in the National Register of Historic Places (NRHP). Between 1977 and 1991, archeological surveys covering approximately 95 percent of the post documented over 2,200 prehistoric and historic archeological sites. In 1990, Fort Hood entered into a Programmatic Agreement among the United States Army, the Texas State Historic Preservation Officer (SHPO), and the Advisory Council for Historic Preservation. In accordance with this agreement, personnel from Fort Hood's Cultural Resources Management Program developed a Historic Preservation Plan; it was subsequently renewed in 1994 as a Cultural Resources Management Plan. The Historic Preservation Plan (Jackson 1990) and the Cultural Resources Management Plan (Jackson 1994a) established the long-range plan for managing Fort Hood's cultural resources. With the inventory of cultural resources essentially completed by 1990, the Fort Hood Cultural Resources Management Program began the process of evaluating the prehistoric archeological sites. Mariah Associates, Inc. (Mariah), of Austin, Texas, initiated the testing program and began evaluating prehistoric archeological sites in 1991. Their work

included preliminary evaluations of 571 prehistoric sites in an intensive resurvey and shovel testing program, followed by more-intensive mechanical and hand testing of 113 sites.

Prewitt and Associates, Inc. (PAI) was contracted in 1995 to conduct archeological work at Fort Hood and continued to test and evaluate prehistoric archeological sites in accordance with Fort Hood's Cultural Resources Management Plan. PAI tested 19 prehistoric archeological sites in fiscal year 1995; results of these investigations are reported by Mehalchick et al. (1999). Fort Hood issued three separate delivery orders to PAI in fiscal year 1996 (FY 1996) to conduct archeological testing and evaluation of 42 prehistoric sites. The results of these investigations are the subject of this report.

The 42 sites investigated in FY 1996 are all open campsites, most of which are located in the western portion of the post (Figure 2). These sites are divided into four site groups based on different geographic locations and geomorphic and environmental settings. Fourteen sites are situated in sandy Paluxy sediments on upland slopes in the Cowhouse Creek drainage basin. The 28 non-Paluxy sites are situated in alluvial and/or colluvial settings and are separated into groups based on their geographic locations. Fifteen of these are in the drainage basins of House or Ripstein Creeks (tributaries to Cowhouse Creek), while eight are situated within the drainage basins of Cowhouse, Table Rock, or Cottonwood Creeks (the latter two are tributaries to Cowhouse). The remaining five sites are situated along other drainages in the northern and eastern portions of the post. The four site groups defined based on these distinctions are Paluxy, House-Ripstein Creek, Cowhouse-Table Rock-Cottonwood Creek, and other open sites.

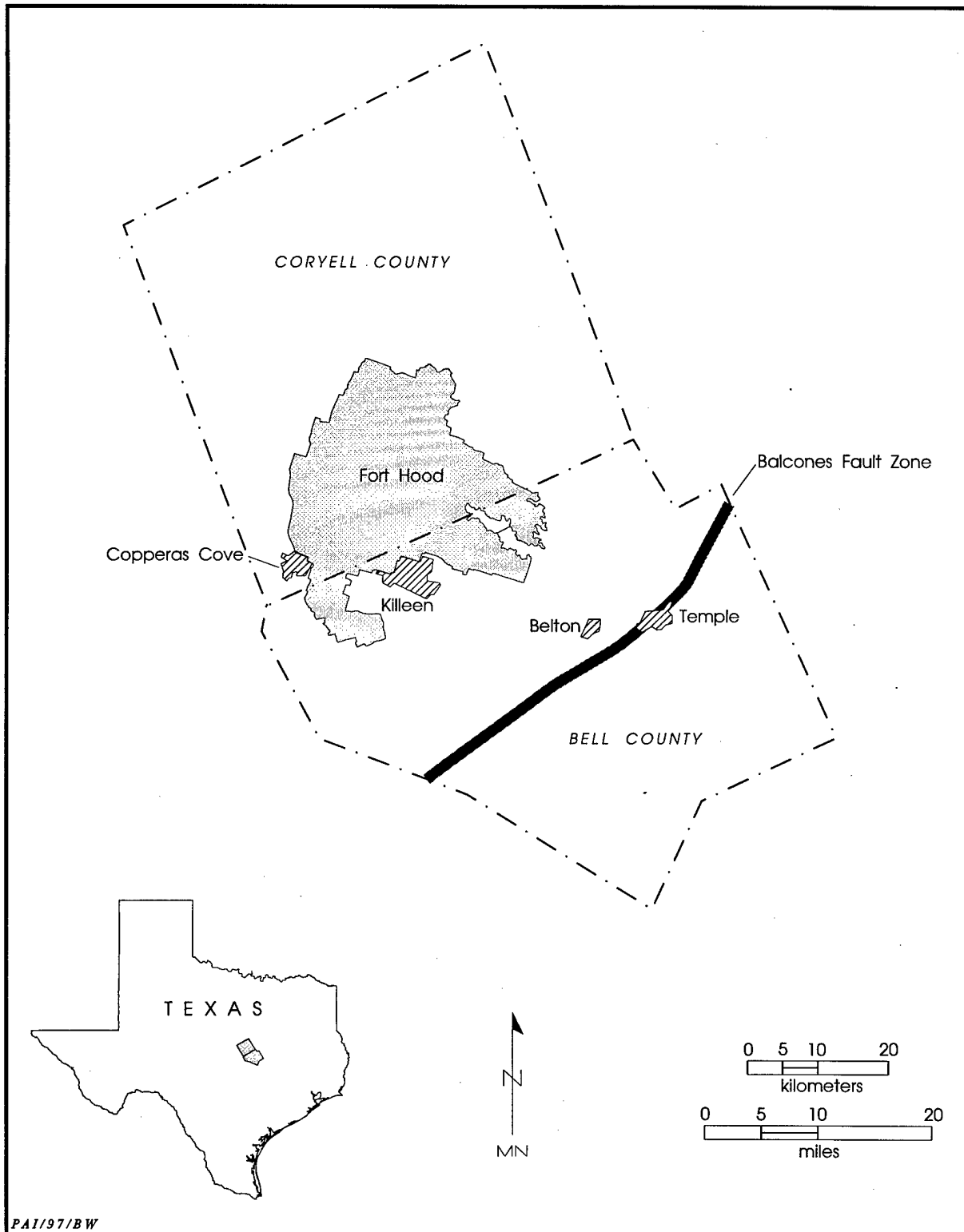
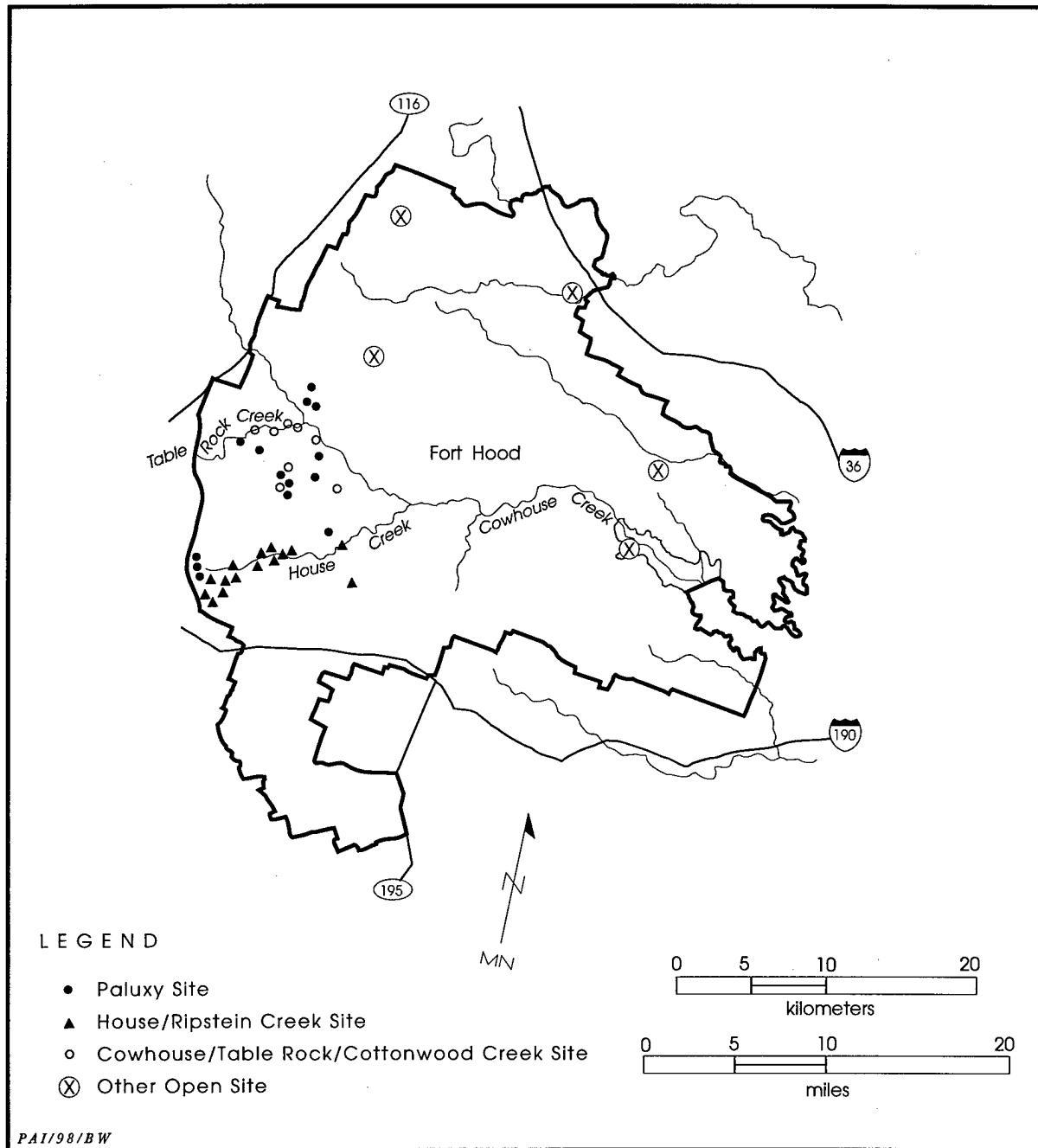


Figure 1. Location of Fort Hood.



**Figure 2.** Site groupings for the 42 prehistoric sites investigated in FY 1996.

This report is organized into 13 chapters and 7 appendices. Chapter 2 presents general environmental background data for Fort Hood and describes specific environmental characteristics that distinguish the three site groupings mentioned above (i.e., Paluxy, House-Ripstein Creek, and Cowhouse-Table Rock-Cottonwood Creek

sites). Chapter 3 presents archeological background information for the Central Texas region and Fort Hood project area and discusses the research design that guided the site testing. Chapter 4 summarizes the FY 1996 field investigations and describes the field, laboratory, and analytical methods that were utilized.

Chapter 5 presents results of intensive geomorphic investigations aimed at defining sediments and site formation processes. The next four chapters describe the results of prehistoric site testing. Paluxy sites are discussed in Chapter 6, House-Ripstein Creek sites in Chapter 7, Cowhouse-Table Rock-Cottonwood Creek sites in Chapter 8, and other open sites in Chapter 9. In addition to providing information on site setting and previous archeological work, each site summary discusses the level of testing, artifacts recovered, features encountered, chronological assessment and geomorphic context of the cultural deposits, and interpretations of the cultural data. When appropriate, horizontally and/or vertically discrete cultural zones that are reasonably well dated are defined as separate analytical units. These analysis units reflect the most discrete groups of cultural materials/features that may be defined based on the limited testing results.

Cultural materials recovered from all sites are described in Chapter 10. The following analytical categories are used for description: chipped stones, ground and battered stones, modified bones and shells, burned and fire-cracked rocks, unmodified bones and shells, and macrobotanical remains. Typological analyses of natural chert samples from the House Creek area are presented in Chapter 11, along with results of a series of chert typology replicability tests. These studies point out some problems in our perceptions of chert distribution on Fort Hood and with the established chert typology. Recommendations for future chert typological studies also are made.

Chapter 12 interprets the archeological data

by comparing and contrasting geomorphic and cultural observations pertaining to the four groups of sites. In addition, inferences of cultural behavior are offered based on detailed intersite comparisons of lithic assemblages, features, and subsistence data. The final chapter summarizes the testing results and recommendations of NRHP eligibility for all 42 sites. Chapter 13 also recommends appropriate strategies for data recovery or more-intensive testing preparatory to data recovery for all National Register-eligible sites. This chapter concludes with general recommendations for Fort Hood's Cultural Resources Management Program.

The appendixes provide a wide range of technical data. Appendix A summarizes the 60 radiocarbon dates obtained during the FY 1996 investigations and provides corrected radiocarbon ages,  $\delta^{13}\text{C}$  values, and tree ring calibrations. Geological descriptions of selected stratigraphic profiles (backhoe trenches and/or test units) are presented in Appendix B. Appendix C presents data derived from textural, chemical, and petrographic analyses of sediment samples from a Paluxy site. The next two appendixes describe results of special studies of selected samples by technical consultants; an analysis of vertebrate faunal remains by Barry Baker is presented in Appendix D and an analysis of macrobotanical remains by Phil Dering (Texas A&M University) is presented in Appendix E. Appendix F summarizes the Fort Hood chert typology developed by TRC Mariah Associates and utilized in the analyses of lithic artifacts. Finally, Appendix G presents metric and nonmetric attributes for the 11 arrow points and 146 dart points recovered during the 1996 field season.

# ENVIRONMENTAL BACKGROUND

Karl W. Kibler

2

Fort Hood is located in the Lampasas Cut Plain, a subprovince of the Grand Prairie (Hayward et al. 1996), and is dissected by the northeastern edge of the Edwards Plateau (Hill 1901). The area represents a transitional zone from the more humid east to the semiarid west, and the environmental gradient is steep enough that distinct changes in landscape and vegetation are observable moving east to west across Fort Hood. Geologically, Fort Hood is situated west of the Balcones fault zone on lower Cretaceous-age carbonate rocks. A clear and distinct escarpment does not exist along the fault zone in the Fort Hood area; however, distinct differences do exist between the soils and vegetation developed on the upper Cretaceous (Gulfian Series) rocks east of the fault zone and those developed on the lower Cretaceous (Comanchean Series) rocks to the west (Abbott 1995a:5).

## CLIMATE

The modern climate of the Fort Hood area is subtropical, characterized by hot, humid summers and relatively short, dry winters (Natural Fibers Information Center 1987:6). The prevailing wind blows from the south, reaching its peak strength during the spring. Summer temperatures are high, with an overall average of 83°F (28.3°C) and an average daily maximum of 96°F (35.5°C) in Coryell County. The average temperature in winter is 49°F (9.4°C), but tends to vary considerably due to the periodic passage of northern cold fronts, resulting in a pattern of alternating cold and mild days (McCaleb 1985:3).

Annual precipitation is approximately 32.5 inches (82.6 cm) for Coryell County (Natural Fibers Information Center 1987:121). Although rainfall occurs year-round, the overall distribu-

tion pattern is bimodal, with peak rainfall occurrences in the late spring and early fall.

## FLORA AND FAUNA

The flora and fauna of Fort Hood are typical of the Balconian and Texan biotic provinces (Blair 1950). The biotic assemblage represents a mix of species from the Blackland Prairie to the east and the Edwards Plateau to the west. Many specific ecological niches also exist across the base, depending on the local topography, slope aspect, soil, and geology. The eastern side of the facility is characterized by dense juniper/oak forest and scrub, while upland areas to the west and south are generally more open. Grasslands are most common on the intermediate upland surfaces, while the high upland surface is typically covered by juniper/oak scrub. Riparian zones are common along drainages; they exhibit a variety of hardwood species.

The Balconian faunal assemblage includes 57 species of mammals, but none are solely restricted to the Balconian province (Blair 1950: 113). Eight of these species also inhabit the Texan province to the east and the interconnecting riparian zones (Blair 1950:101). Other native faunas include 36 species of snakes, 15 anuran species, and 16 species of lizards. Several prehistorically significant economic species, such as bison and pronghorn antelope, have been removed from the area in historic times.

## GEOLOGY, GEOMORPHOLOGY, AND LATE QUATERNARY STRATIGRAPHY

The Fort Hood landscape consists of the dissected northeastern margin of the uplifted



Edwards Plateau and reflects the variable resistances of the various underlying geologic formations to erosion. Structurally, the area is underlain by a deeply buried extension of the Paleozoic-age Ouachita Mountains, which divide the stable continental interior to the west from the subsiding Gulf basin to the southeast. During the Cretaceous period, this region consisted of a very broad shelf covered by a shallow sea. Limestones and marls were deposited on the shelf as the shoreline fluctuated for more than 80 million years. Occasionally, relatively thin deposits of sand derived from terrestrial sources also accumulated on the shelf, resulting in interbedded formations like the Paluxy Formation and Trinity Sands. The Gulf basin subsided during the Miocene, resulting in the development of the Balcones fault zone along the old Ouachita line and the uplift of the Edwards Plateau (Woodruff and Abbott 1986). West of the Balcones fault, the Cretaceous-age limestones and marls remain relatively horizontal and structurally unmodified, while the Cretaceous-age rocks to the east dip sharply Gulfward and are buried deeply by Gulfian and later lithological units.

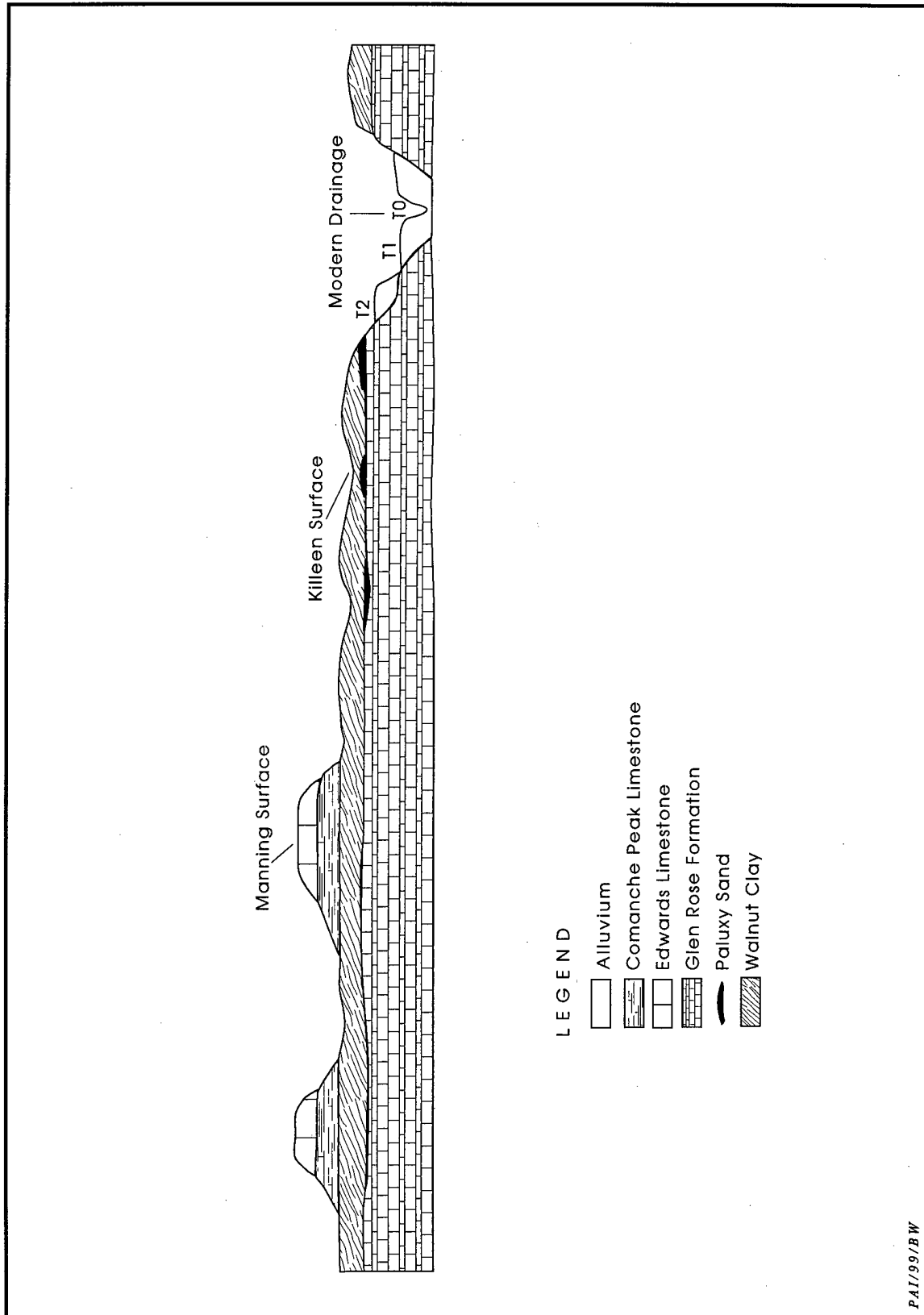
Because Fort Hood is west of the fault zone, it is underlain by relatively flat-lying lower Cretaceous rocks exhibiting a two-tiered topography (Figure 3) locally termed the Lampasas Cut Plain (Hayward et al. 1990). This landscape developed between the Brazos and Colorado Rivers and consists of large, mesalike remnants of an early Tertiary-age planation surface surrounded by a broad, rolling pediplain formed during the late Tertiary and early Quaternary. These two surfaces differ by 25 to 40 m in elevation and form the "high" and "intermediate" uplands of Hayward et al. (1990) and the "Manning" and "Killeen" surfaces of Nordt (1992). Modern stream valleys are incised approximately 40 to 70 m into the pediplain surface.

The oldest rocks exposed at Fort Hood belong to the Trinity Group, which includes the Glen Rose Formation. This formation is surficially exposed on the western side of Fort Hood, where relatively deep incision of the landscape by Cowhouse Creek and its tributaries has removed the overlying rocks (Proctor et al. 1970; Sellards et al. 1932).

Resting on the Trinity Group are rocks of the lower Cretaceous Fredericksburg Group. The lowest unit is the Paluxy Formation, a terrig-

enous siliclastic unit of strandplain, fluvial, and deltaic deposits. The Walnut Clay, which is widely exposed at Fort Hood and forms the principal substrate of the Killeen surface, overlies the Paluxy Formation. Above the Walnut Clay lies the Comanche Peak Limestone, which forms the intermediate slopes of the higher Manning surface. The highest extensive lithological unit is the Edwards Group, including the Edwards Limestone which forms the resistant cap of the high upland mesas or Manning surface. Edwards Group formations also are a very important source of high-quality chert (see Frederick and Ringstaff 1994; Frederick et al. 1994).

The stratigraphy and soil geomorphology of a number of larger Fort Hood streams have been studied in detail by Nordt (1992, 1993, 1995), who identifies six principal alluvial units in the study area (Figure 4). From oldest to youngest, these units are termed the Reserve alluvium, Jackson alluvium, Georgetown alluvium, Fort Hood alluvium, West Range alluvium, and Ford alluvium (Nordt 1992). The Reserve alluvium is a fill of middle to late Pleistocene age that forms the T<sub>3</sub> terrace of the Leon River. The Jackson alluvium is approximately 15,000 years old and consists of 3–4 m of gravelly and loamy deposits resting on a bedrock strath. It forms the T<sub>2</sub> terraces of the Leon River and Cowhouse Creek and its larger tributaries. The Georgetown alluvium is the oldest unit within the deeply entrenched Holocene valley of Cowhouse Creek and its larger tributaries. It is always buried below the T<sub>1</sub> terrace surface. Deposition of this unit began no earlier than 11,300 B.P. and terminated by 8200 B.P. (Nordt 1992). The 4- to 6-m-thick fill consists of gravelly and loamy deposits. The Royalty paleosol, formed on top of the Georgetown alluvium, typically consists of a truncated Bk horizon containing secondary precipitates of calcium carbonate. The Fort Hood alluvium is the major Holocene unit by volume along Cowhouse Creek and most of its tributaries. It consists of 9–10 m of gravelly and loamy deposits that date between about 8000 and 4800 B.P. The West Range alluvium accumulated in two episodes between 4300 and 600 B.P., with a brief erosional period between 3000 and 2000 B.P. The West Range unit is typically 9 m thick; it partially truncates and buries the Fort Hood alluvium in some areas. The Fort Hood and West Range alluviums aggraded to the same elevation in many of the valleys, making the T<sub>1</sub>



**Figure 3.** Generalized geologic cross section of the Lampasas Cut Plain, Central Texas (adapted from Nordt 1992:Figure 3).

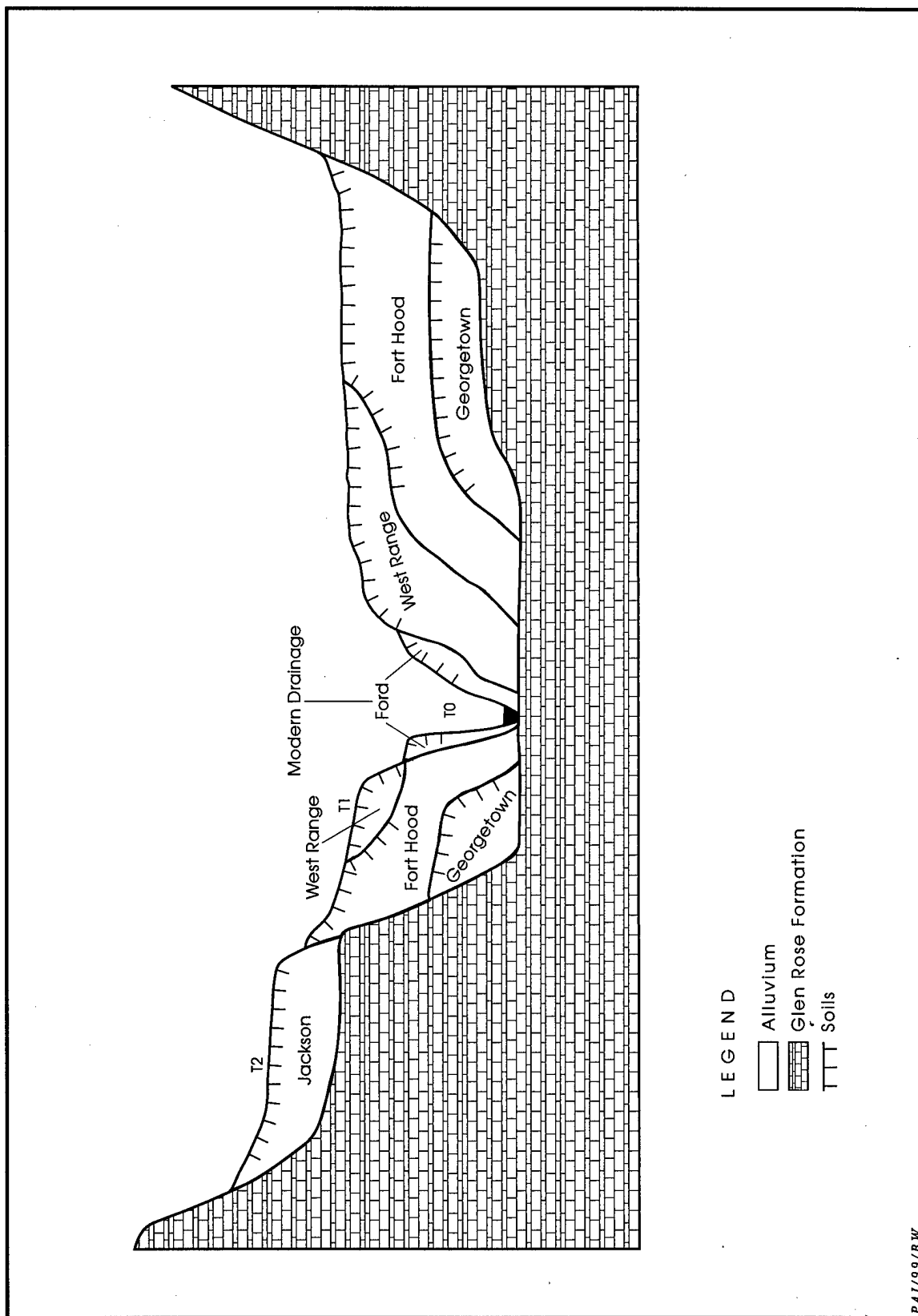


Figure 4. Generalized alluvial stratigraphy of Cowhouse Creek, Fort Hood, Texas (adapted from Nordt 1992: Figure 4).

surface diachronic. Deposition of the Ford alluvium and construction of the modern floodplain, T<sub>0</sub>, began 400 to 600 years ago and is continuing to the present.

In addition to the alluvial deposits within the stream valleys, colluvial and slope wash sediments also form culturally relevant deposits within the base. These deposits occur both as relatively thick wedges of sediment at the base of steeper slopes and as thin mantles on moderate to gentle slopes and level uplands, and they interdigitate with a number of alluvial fills at valley margins. Pedogenically altered late Pleistocene- and Holocene-age colluvial and slope wash sediments derived from the Paluxy Formation are particularly significant deposits, encapsulating prehistoric cultural materials and features along the upper margins of many Pleistocene-age valleys at Fort Hood. Also archeologically significant are rockshelters and their accompanying sedimentary fills. Rockshelters and small overhangs are very common on Fort Hood, and the nature of their fills varies from shelter to shelter. Abbott (1995b:835) has defined and interpreted six types of rockshelter fills and their origins.

### ENVIRONMENTAL SETTING OF THE CURRENT INVESTIGATIONS

The 42 prehistoric archeological sites investigated in 1996 are grouped by shared or common geographic, environmental, and geomorphic characteristics. The majority of the sites (n = 37, 88 percent) are sorted into three groups: sites situated in Paluxy sediments; sites on House and Ripstein Creeks; and sites on Cowhouse, Table Rock, and Cottonwood Creeks. The remaining "other" sites (n = 5, 12 percent) are scattered across Fort Hood and vary considerably in their geomorphic and environmental settings. Environmental characteristics of each area represented by these site groups are discussed in greater detail below.

#### Paluxy Sediments

Paluxy sites rest on pedogenically altered Paluxy Formation sediments or are encapsulated in late Quaternary-age colluvial and slope wash sediments derived from the Paluxy Formation. These sites occur along the upper margins of Pleistocene valleys across the western portion

of Fort Hood, where Paluxy Formation outcrops are fairly common. The Paluxy substrate supports soils of the Cisco and Wise series (McCaleb 1985). Cisco soils are Alfisols with well-developed argillic horizons, while Wise soils are weakly developed sandy Inceptisols.

Climax plant communities on the Paluxy Formation vary from true prairies consisting mainly of tall grasses to post oak-blackjack oak savannahs containing tall and mid grasses (McCaleb 1985). The tallgrass prairies primarily consist of little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), big bluestem (*Andropogon gerardii*), and indiangrass (*Sorghastrum nutans*), all of which are easily disturbed by heavy grazing. Forbs and trees are minor components (comprising less than 30 percent of this community), but include Gay feather (*Liatris elegans*), Engelmann's daisy (*Engelmannia pinnatifida*), Maximilian sunflower (*Helianthus maximiliani*), American elm (*Ulmus americana*), common hackberry (*Celtis occidentalis*), and live oak (*Quercus virginiana*) (McCaleb 1985:38).

Arboreal species of the post oak-blackjack oak savannah include post oak (*Quercus stellata*), blackjack oak (*Quercus marilandica*), American elm, Mexican plum (*Prunus mexicana*), American beautyberry (*Callicarpa americana*), and hawthorn (*Crataegus* spp.). The oak overstory shades approximately 20 percent of the ground. Grasses, such as little bluestem, big bluestem, indiangrass, switchgrass, beaked panicum (*Panicum anceps*), purpletop tridens (*Tridens flavus*), sand lovegrass (*Eragrostis trichodes*), Virginia wildrye (*Elymus virginicus*), and Canada wildrye (*Elymus canadensis*), comprise 80 percent of the vegetative community and are sensitive to overgrazing (McCaleb 1985:40).

#### House and Ripstein Creeks

Prehistoric sites in the House and Ripstein Creeks group are found resting on and buried in alluvial terraces and colluvial slopes of these creek valleys. Ripstein Creek is a tributary of House Creek, which debouches into Cowhouse Creek ca. 14.5 km downstream from its confluence with Ripstein. The House Creek drainage basin (which includes Ripstein) is approximately 168 km<sup>2</sup>, with the trunk streams incised into the Glen Rose limestone (Nordt 1992:35).

Alluvial deposits form three distinct surfaces within the House Creek valley (see Nordt 1992:35–39) and at least two in the Ripstein Creek valley. The highest alluvial surface ( $T_2$ ) is 8–11 m above House and Ripstein Creeks and is underlain by the late Pleistocene Jackson alluvium. The intermediate surface can be divided into two components ( $T_{1a}$  and  $T_{1b}$ ) and is 3–5 m above the House Creek channel, but is not present along Ripstein Creek. The  $T_{1a}$  terrace consists of the Georgetown alluvium overlain by the Fort Hood alluvium. The  $T_{1b}$  terrace is inset to the  $T_{1a}$  by an erosional unconformity. Its surface grades to the  $T_{1a}$  surface, which is generally ca. 1 m higher. The  $T_{1b}$  is comprised of lower West Range fill. The Ford alluvium makes up the lowest surface, the  $T_0$ , in both the House and Ripstein Creek valleys. The lower colluvial slopes of these valleys are mantled with thin Holocene-age gravelly to clayey deposits.

Soils along House and Ripstein Creeks belong to the Doss-Real-Krum soils map unit (McCaleb 1985). The lower stream terraces are mantled by dark clayey to loamy Mollisols of the Bosque series. Lewisville soils occupy the higher  $T_2$  terraces and are loamy Mollisols. Shallow gravelly loamy Mollisols occupy the lower toeslopes of the valleys and belong to the Real soil series. Doss soils are loamy Mollisols imprinted on weathered marls of the valleys' midslopes.

Plant communities along House and Ripstein Creeks include a mix of mid- and tallgrass prairies and riparian zones of hardwood arboreal species (McCaleb 1985:38–40). Pecan (*Carya illinoensis*), American elm, common hackberry, post oak, blackjack oak, live oak, cottonwood (*Populus* spp.), redbud (*Cercis canadensis*), and western soapberry (*Sapindus saponaria*) occupy the lower stream terraces with an understory of little bluestem, big bluestem, indiagrass, and switchgrass. Tallgrass prairies occupy the higher stream terraces, while the lower toeslopes of the valley are covered with tall grasses and scattered clusters of Texas (*Quercus texana*) and live oaks. Mid to tall grasses occupy the valleys' midslopes.

#### **Cowhouse, Table Rock, and Cottonwood Creeks**

Prehistoric sites within the Cowhouse, Table Rock, and Cottonwood Creek drainages are found

resting on and encapsulated in alluvial terraces and colluvial slopes of these creek valleys. Table Rock and Cottonwood Creeks are tributaries of Cowhouse Creek. The Cowhouse Creek drainage basin covers 1,700 km<sup>2</sup>, with the trunk streams entrenched into the Glen Rose limestone (Nordt 1992:10).

Alluvial deposits form three distinct surfaces within the Cowhouse and Table Rock Creeks valleys (see Nordt 1992). The highest alluvial surfaces ( $T_2$ ) on Cowhouse and Table Rock Creeks are 15–16 m and 9–10 m above the channels, respectively, and are underlain by the late Pleistocene Jackson alluvium. An equivalent surface has not been observed along Cottonwood Creek. The intermediate surface,  $T_1$ , is 8–10 m above the Cowhouse Creek channel and is underlain by the Georgetown, Fort Hood, and West Range alluvial units. Unlike Cowhouse Creek, the  $T_1$  terrace surface of Table Rock Creek is divided into  $T_{1a}$  and  $T_{1b}$  components which are 6–7 m above the creek channel. The  $T_{1a}$  terrace consists of the Georgetown alluvium overlain by the Fort Hood alluvium. The  $T_{1b}$  terrace is inset to the  $T_{1a}$  terrace within the modern meander-belt. The  $T_{1b}$  is comprised of upper West Range fill with a thin mantle of Ford alluvium. The Ford alluvium makes up the lowest surface,  $T_0$ , in the Cowhouse and Table Rock Creek valleys.

Within Cottonwood Creek, alluvial fills equivalent to the lower and upper West Range alluvial units (and possibly the Fort Hood) were identified by Abbott (in Trierweiler, ed. 1996:187) as forming a  $T_{1a}$  terrace 11–12 m above the channel. Two lower terraces,  $T_{1b}$  and  $T_0$ , are comprised of Ford and possibly upper West Range sediments. The lower colluvial slopes of all three of these stream valleys are mantled with gravelly to clayey deposits of late Pleistocene (in Cowhouse Creek) to Holocene age (in Table Rock and Cottonwood Creeks).

Soils in the Cowhouse, Table Rock, and Cottonwood Creek drainage basins belong to the Doss-Real-Krum and Bosque-Frio-Lewisville soils map units (McCaleb 1985). The lower stream terraces are mantled by dark clayey to loamy Mollisols of the Bosque series. In addition, the Frio soil, a dark silty clayey Mollisol, is present on the lower terraces of Cowhouse Creek. Lewisville and Seawillow soils occupy the higher  $T_2$  terraces and are loamy Mollisols and Inceptisols, respectively. Shallow

gravelly loamy Mollisols occupy the lower toeslopes of the valleys and belong to the Real soil series. Doss soils are loamy Mollisols imprinted on weathered marls of the valleys' midslopes.

Plant communities along Cowhouse, Table Rock, and Cottonwood Creeks are similar to those found along House and Ripstein Creeks. They include a mix of mid- and tallgrass prairies and riparian zones of hardwood arboreal species with an understory of mid and tall grasses.

### **Other Sites**

Five of the 42 investigated sites (41BL340, 41CV755, 41CV957, 41CV1092, and 41CV1152) do not fall into any of the three groups discussed. However, all of these sites are located in some of the smaller stream valleys (e.g., Henson, Owl, and Browns Creeks) around the base, and their local geomorphology (see Nordt [1992, 1993] for alluvial stratigraphy of these streams) and environments share many characteristics with the House and Ripstein Creeks area.

# ARCHEOLOGICAL BACKGROUND AND RESEARCH CONTEXTS

*Karl W. Kibler and Douglas K. Boyd*

3

## REGIONAL CULTURAL CHRONOLOGY AND PALEOENVIRONMENTAL RECONSTRUCTION

The prehistoric cultural sequence for Central Texas can be divided into three broad periods: Paleoindian, Archaic, and Late Prehistoric, although the terms Neoarchaic (Prewitt 1981, 1985) and Post-Archaic (Johnson and Goode 1994) have been used at times in place of Late Prehistoric. Prewitt's (1981, 1985) cultural-historical framework incorporating discrete temporal and technological units (i.e., phases) is used by many researchers, but recently revised chronologies have been proposed by Johnson and Goode (1994) and Collins (1995). These revisions do not use the term phase to describe cultural-historical units; instead, named intervals or patterns based on diagnostic projectile point styles and associated radiocarbon assays (e.g., Martindale-Uvalde interval of the Early Archaic period) within each period or subperiod are used. These three cultural chronologies are compared in Figure 5. Figure 6 compares paleoenvironmental reconstructions offered by Johnson and Goode (1994) and Collins (1995) with paleoenvironmental models offered by Nordt et al. (1994) and Toomey et al. (1993) for the Central Texas region.

The Paleoindian period (11,500–8800 B.P.) represents the earliest known cultural manifestation in North America. Sites and isolated artifacts from this period are fairly common across Central Texas. The period is often described as having been characterized by small but highly mobile bands of foragers who were specialized hunters of Pleistocene megafauna. A more accurate view of Paleoindian lifeways includes the utilization of a much wider array of subsis-

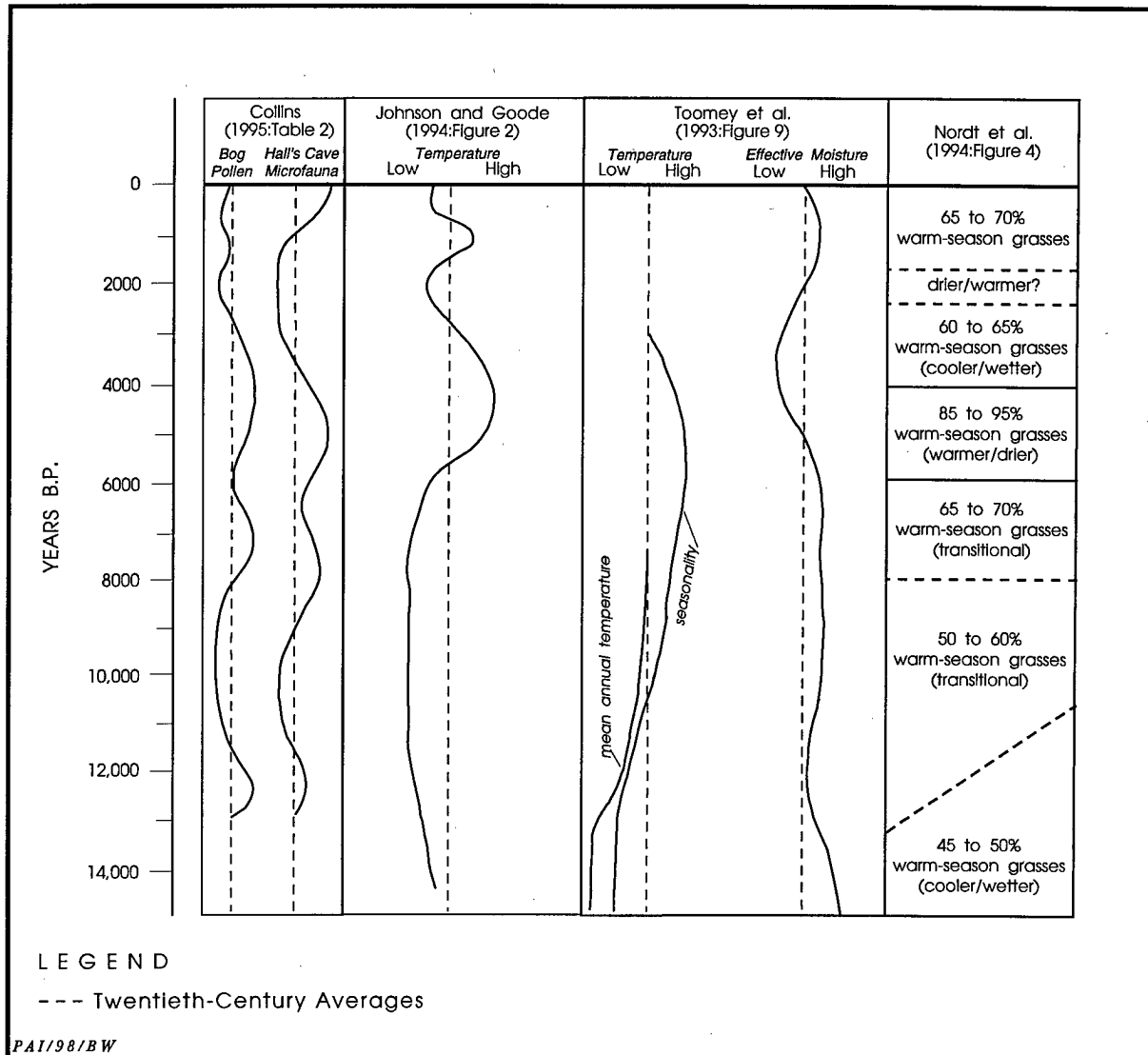
tence resources. Recent investigations at the Wilson-Leonard site (41WM235) support this view and have challenged the fundamental defining criteria of the Paleoindian period, that of artifacts in association with late Pleistocene megafauna (Masson and Collins 1995). Environmental conditions during the Paleoindian period were quite different than today, presenting the early inhabitants with a different array of resources. Nordt et al. (1994) view this period as a transition between cooler, moister late Pleistocene conditions and warmer, drier Holocene conditions. They estimate that warm-season, or C<sub>4</sub>, grasses steadily increased in abundance throughout this period. Toomey et al. (1993) also see this time as a period of transition, with summer temperatures increasing rapidly but still 2–3°C below modern values. Toomey et al. (1993) suggest that a decrease in effective moisture beginning around 14,000 B.P. intensified and culminated ca. 10,500 B.P.

Collins (1995) divides the Paleoindian period into early and late subperiods. The early subperiod consists of two projectile point style intervals, Clovis and Folsom. Clovis chipped stone artifact assemblages, including the diagnostic fluted lanceolate Clovis point, were produced by bifacial, flake, and prismatic-blade techniques on high quality and oftentimes exotic lithic materials (Collins 1990). Along with chipped stone artifacts, Clovis assemblages include engraved stones, bone and ivory points, stone bolas, and ochre (Collins 1995:381; Collins et al. 1992). Clovis artifacts suggest well-adapted, generalized hunter-gatherers who possessed the technology to hunt larger game but did not solely rely on it. In contrast, Folsom tool kits, consisting of fluted Folsom points, thin unfluted (Midland) points, large thin bifaces, and end scrapers, are

YEARS		CENTRAL TEXAS ARCHEOLOGICAL PERIODS & PHASES		CENTRAL TEXAS ARCHEOLOGICAL ERAS, PERIODS & PROJECTILE POINT STYLE PATTERNS		CENTRAL TEXAS ARCHEOLOGICAL PERIODS, SUBPERIODS & PROJECTILE POINT STYLE INTERVALS		
B.P.	A.D. B.C.	(Prewitt 1981, 1985)		(Johnson & Goode 1994)		(Collins 1995)		
0		HISTORIC				HISTORIC		
		NEO- ARCHAIC	Toyah	POST - ARCHAIC ERA	Triangular	LATE PRE- HISTORIC	Perdiz	
	1000		Austin		Scallorn Edwards		Scallorn - Edwards	
		LATE ARCHAIC	Driftwood	II	Darl, Figueroa	LATE	Darl	
			Twin Sisters		Ensor, Frio		Ensor - Frio - Fairland	
2000	0		Uvalde					
		MIDDLE ARCHAIC	San Marcos	LATE ARCHAIC PERIOD	Marcos	LATE	Marcos - Montell - Castroville	
	1000		Round Rock		Castroville		Lange - Marshall - Williams	
			Marshall Ford		Montell		Pedernales - Kinney	
			Marshall		Marshall			
4000	2000		Clear Fork	I	Pedernales Bulverde		Bulverde	
			Oakalla	MIDDLE ARCHAIC PERIOD	Nolan, Travis La Jita	MIDDLE	Nolan - Travis	
	3000		Jarrell		Unnamed Styles Early Triangular Merrell		Taylor	
					Calf Creek/Bell		Bell - Andice - Calf Creek	
6000	4000	EARLY ARCHAIC	San Geronimo		(Martindale, Uvalde)	EARLY	Martindale - Uvalde	
			Circleville	EARLY ARCHAIC PERIOD	Early Barbed Series Early Split - Stem Series	EARLY	Early Split Stem	
	5000				(Hoxie)		Angostura	
8000	6000	PALEO - INDIAN		PALEO - INDIAN ERA		LATE	St. Mary's Hall	
								Golondrina - Barber
	7000							Wilson
								Plainview
10000	8000					EARLY	Folsom	
	9000						Clovis	

**Figure 5.** Prehistoric cultural sequences of Prewitt (1985:Figure 5), Johnson and Goode (1994:Figure 2), and Collins (1995:Table 2).





**Figure 6.** Late Pleistocene and Holocene paleoenvironmental records of Collins (1995:Table 2), Johnson and Goode (1994:Figure 2), Toomey et al. (1993:Figure 9), and Nordt et al. (1994:Figure 4).

more indicative of specialized hunting, particularly of bison (Collins 1995:382).

Spanning the late Paleoindian subperiod are several projectile point styles for which temporal, technological, or cultural significance is unclear. Plainview, a type name typically assigned to any unfluted, lanceolate Paleoindian point, is one example. Collins (1995:382) has noted that most of these points are not similar to the Plainview type-site points in thinness and flaking technology. Also problematic are the chronological position and cultural significance of Dalton and San Patrice dart points. The succeed-

ing late Paleoindian subperiod includes three projectile point style intervals: Wilson (ca. 10,000–9650 B.P.), Golondrina-Barber, and St. Mary's Hall (9500–8800 B.P.). Components and artifact and feature assemblages of these three intervals appear to be Archaic-like in nature and in many ways may represent a transition between the early Paleoindian and succeeding Archaic periods (Collins 1995:382).

The Archaic period (8800 to 1300–1200 B.P.) is generally believed to represent a shift toward hunting and gathering of a wider array of animal and plant resources and a decrease in group

mobility (Wiley and Phillips 1958:107–108), although such changes may have been well under way by the beginning of the period. Throughout the ca. 7,600-year-long period, major climatic changes probably presented Archaic populations with varying subsistence challenges. The Archaic is generally subdivided into Early, Middle, and Late subperiods (Black 1989; Collins 1995; Story 1985:28–29). Each of the three Archaic subperiods includes several temporal-stylistic units or intervals based on diagnostic projectile point styles and associated radiocarbon assays (Collins 1995).

Early Archaic (8800–6000 B.P.) sites are small and their tool assemblages are very diverse (Weir 1976:115–122). This suggests that groups were highly mobile and population densities were low (Prewitt 1985:217). It has been noted that Early Archaic sites are concentrated along the eastern and southern margins of the Edwards Plateau (Johnson and Goode 1994; McKinney 1981). This distribution may be indicative of climatic conditions at the time, as these environments had many more-reliable water sources and a diverse subsistence base. Microfaunal records and sedimentary evidence from stream valleys and caves along the eastern Edwards Plateau depict a climatic regime in flux, from mesic conditions during the beginning of the Early Archaic to extremely xeric and back to mildly xeric conditions at the end of the subperiod (Collins et al. 1990; Toomey et al. 1993). Three projectile point style intervals are recognized: Angostura; Early Split Stem, including Gower and Jetta; and Martindale-Uvalde. Manos, metates, hammerstones, Clear Fork and Guadalupe bifaces, and a variety of other bifacial and unifacial tools are common to all three intervals. The construction and use of rock hearths and ovens reflect a specialized subsistence strategy (exploitation of roots and tubers?) during the Early Archaic. These burned rock features most likely represent the technological predecessors of the larger burned rock middens used extensively later in the Archaic period (Collins 1995:383).

During the Middle Archaic period (6000–4000 B.P.) the number and distribution of sites, as well as site size, increased due to probable increases in population densities (Prewitt 1981:73; Weir 1976:124,135). Macrobands may have formed at least seasonally, or increased numbers of small groups may have utilized the same sites

for longer periods of time (Weir 1976:130–131). A greater reliance on plant foods is suggested by the presence of burned rock middens toward the end of the Middle Archaic, although tool kits still imply a strong reliance on hunting (Prewitt 1985:222–226). Three projectile point style intervals comprise the Middle Archaic: Bell-Andice-Calf Creek, Taylor, and Nolan-Travis. The Bell-Andice-Calf Creek and Taylor intervals reflect a shift in lithic technology from the preceding Martindale-Uvalde (Collins 1995:384).

Johnson and Goode (1994:25) suggest that the Bell-Andice-Calf Creek interval represents an influx of bison-hunting groups from the Eastern Woodland margins into the Central Texas region during a slightly more mesic period. Bison disappeared as more-xeric conditions returned during the later Nolan-Travis interval. The style change represents another shift in lithic technology (Collins 1995:384; Johnson and Goode 1994:27). Prewitt (personal communication 1997) postulates that the production and morphology of Travis and Nolan points are similar to projectile points from the Lower Pecos region. Such characteristics as beveled stems and overall morphology may have originated in the Lower Pecos, since their presence there predates their appearance in Central Texas. The accompanying change to more-xeric conditions bears witness to the construction and use of burned rock middens. Johnson and Goode (1994:26) believe that the dry conditions promoted the spread of xerophytic plants, such as yucca and sotol, and that these plants were collected and cooked in large rock ovens by late Middle Archaic peoples.

Both Collins (1995) and Johnson and Goode (1994) recognize a period of extreme aridity in Central Texas during the Archaic period; the construction and use of burned rock middens were probable responses to these xeric conditions. However, Collins (1995), as well as Nordt et al. (1994) and Toomey et al. (1993), views these xeric conditions as the culmination of a continual decrease in effective moisture since the end of the Pleistocene, while Johnson and Goode (1994) do not. In addition, Johnson and Goode (1994) believe the period of aridity (their Edwards interval) occurred slightly later, at ca. 4250–2550 B.P., compared to Collins's (1995) much longer Altithermal climate at 8500–6800 and 5500–3000 B.P. (cf. Nordt et al. [1994] and Toomey et al. [1993] in Figure 6).

During the succeeding Late Archaic period

(4000 to 1300–1200 B.P.), populations continued to increase (Prewitt 1985:217). The establishment of large cemeteries along drainages suggests strong territorial ties by certain groups (Story 1985:40). Xeric conditions continued but became more mesic ca. 3500–2500 B.P. The Late Archaic period encompasses six projectile point style intervals (Collins 1995:376): Bulverde, Pedernales-Kinney, Lange-Marshall-Williams, Marcos-Montell-Castroville, Ensor-Frio-Fairland, and Darl. Johnson and Goode (1994:29–35) divide the Late Archaic into two parts, Late Archaic I and Late Archaic II, based on increased population densities and evidence of Eastern Woodland ceremonial rituals and religious ideological influences. Middle Archaic subsistence technology, including the use of burned rock middens, continued into the Late Archaic period. According to Collins (1995:384), the construction and use of burned rock middens reached a zenith during the Pedernales-Kinney interval and declined during the latter half of the Late Archaic. However, mounting chronological data suggest that midden formation and use culminated much later, during the Ensor-Frio-Fairland and Darl intervals, and that this high level of use continued into the early Late Prehistoric period (Black et al. 1997; Kleinbach et al. 1995:795). That burned rock midden use in the eastern part of Central Texas was prevalent after 2000 B.P. is gradually becoming clear. This scenario parallels the widely recognized occurrence of post-2000 B.P. middens in the western reaches of the Edwards Plateau (see Goode 1991). The use of burned rock middens appears to have been a major part of the subsistence strategy, as a decrease in the importance of hunting, implied by the low ratios of projectile points to other tools in site assemblages, may have occurred (Prewitt 1981:74).

The Late Prehistoric period (ca. 1300–1200 to 300 B.P.) is marked first by the introduction of the bow and arrow into the region, and later by the appearance of ceramics. These innovations probably came from the north, by persons or mechanisms unknown (Prewitt 1985:228). Population densities dropped considerably from their Late Archaic peak (Prewitt 1985:217). The use of burned rock middens for plant food processing continued throughout the Late Prehistoric period (Black et al. 1997; Goode 1991; Kleinbach et al. 1995:795). Subsistence strategies did not differ greatly from the preceding period, although bison became an important economic resource

during the later part of the Late Prehistoric period (Prewitt 1981:74). Horticulture came into play very late in Central Texas and was of minor importance to the overall subsistence strategy (Collins 1995:385).

In Central Texas, the Late Prehistoric period is generally associated with the Austin and Toyah phases (Jelks 1962; Prewitt 1981:82–84); however, both phases have a wider application. Austin and Toyah phase horizon markers, Scallorn-Edwards and Perdiz arrow points, respectively, are distributed across most of the state. The introduction of Scallorn and Edwards points into Central Texas is often marked by evidence of violence and conflict; many excavated burials from this period contain these arrow tips in contexts indicating that they were the cause of death (Prewitt 1981:83). Subsistence strategies and technologies (other than the shift from dart to arrow points) did not change much from the preceding Late Archaic. This continuity is recognized by Prewitt's (1981) use of the term "Neoarchaic." In fact, Johnson and Goode (1994:39–40) and Collins (1995:385) state that the break between the Late Archaic and the Late Prehistoric could easily and appropriately be represented by the break between the Austin and Toyah phases.

Around 1000–750 B.P., slightly more xeric or drought-prone climatic conditions returned to the region, and bison returned to the region in large numbers (Huebner 1991; Toomey et al. 1993). Utilizing this vast resource were Toyah phase peoples equipped with Perdiz-tipped arrows, end scrapers, four-beveled knives, and plain bone-tempered ceramics. The technology and subsistence strategies of the Toyah phase represent a completely different tradition than the preceding Austin phase. Collins (1995:388) states that burned rock middens fell out of use as bison hunting and group mobility obtained a level of importance not witnessed since Folsom times. While the importance of bison hunting and high group mobility can hardly be disputed, the cessation of burned rock midden use during the Toyah phase is tenuous. A recent examination of Toyah-age radiocarbon assays and assemblages by Black et al. (1997) suggests that their association with burned rock middens represents more than a "thin veneer" capping Archaic-age features. They claim that burned rock midden use, while not as prevalent as in preceding periods, still played an important role in the adaptive strategies of Toyah peoples.

Historical accounts of Native Americans and their interactions with the Spanish, the Republic of Mexico, the Texas Republic, and the United States throughout the region are provided by Bolton (1915), Campbell (1988), Campbell and Campbell (1981), Hester (1989), and Newcomb (1961). Collins (1995:386) divides this period into three subperiods. The first, beginning in the late seventeenth and early eighteenth centuries, marks an era of more-permanent contact between Europeans and Native Americans as the Spanish moved northward out of Mexico to establish settlements and missions on their northern frontier. There is little available information on aboriginal groups and their lifeways except for fragmentary data gathered by Spanish missionaries. Much of this sketchy evidence comes from the San Antonio and South Texas areas. Groups in these areas have been referred to collectively as Coahuiltecans because of an assumed similar lifestyle. However, many individual groups may have existed (Campbell 1988). The inevitable and disastrous impacts to native social structures and economic systems by disease and hostile encounters with Europeans and intruding groups, such as the Apache, were already under way at this time.

The second subperiod spans from the establishment of the mission system in the 1720s to its ultimate demise around 1800. Some indigenous groups moved peacefully into mission life, giving up their nomadic hunting and gathering way of life; others were forced in to escape the increasingly hostile actions of southward-advancing Apaches and Comanches. By the end of this time, many Native American groups had been decimated by European expansion and disease. Intrusive groups, such as the Tonkawa, Apache, and Comanche, moved into the region to fill the void. Few sites attributable to these groups, outside of mission sites, have been investigated. To complicate matters, many aboriginal lifestyles continued after Spanish contact. For example, many groups continued to manufacture stone tools even after settling in the missions (Fox 1979). The third subperiod, from 1800 to the last half of the nineteenth century, witnessed the final decimation of indigenous groups and the defeat and removal of the Apaches and Comanches to reservations by the United States.

While the chronologies of Prewitt (1981; 1985), Johnson and Goode (1994), and Collins (1995) all have merit, the latter is used in this

report because it appears to be the most precise in terms of its radiocarbon-dated projectile point sequence. The one exception is that the Austin and Toyah phase names are retained as designations for the two subperiods of the Late Prehistoric period. These phase designations, which correspond precisely with Collins's (1995) Scallorn-Edwards and Perdiz style intervals, respectively, are retained and used in this report because they are very well defined and widely accepted by most researchers.

### **PREVIOUS ARCHEOLOGICAL RESEARCH AT FORT HOOD**

The history of archeological investigations at Fort Hood has been discussed many times and is not revisited here. The reader is referred to Jackson (1994b), Trierweiler (1994b), and Trierweiler et al. (1995) for summaries of archeological investigations conducted in and near Fort Hood. Black (1989), Black et al. (1997), Collins (1995), and Ellis et al. (1994) provide the best background information for understanding the broader history of archeological method and theory in Central Texas. Selected previous investigations in the Fort Hood area are summarized in Table 1.

The inventory of prehistoric sites on Fort Hood is currently 1,094 (as of April 1998), with most of the survey work having been completed (except for some portions of the Live Fire Range) by 1990. Beginning in 1990, archeological investigations began assessing site geomorphology and research potential using reconnaissance and shovel testing. Some 601 sites have been evaluated in this matter (571 by Mariah Associates and 30 by Prewitt and Associates). Beginning about 1993, the Cultural Resources Management Program at Fort Hood began conducting more formal archeological testing of sites to determine eligibility for listing in the National Register of Historic Places (NRHP). The 1996 field season reported herein is part of this process as defined by the Cultural Resources Management Plan. The inventory of NRHP-eligible sites on Fort Hood currently stands at 163 (as of April 1998).

### **PREHISTORIC RESEARCH CONTEXT AND NATIONAL REGISTER SIGNIFICANCE CRITERIA**

Archeological work in Central Texas has

**Table 1. Summary of selected previous archeological research in and near Fort Hood\***

Prehistoric site excavations in Bell County by A. T. Jackson, ca. 1933	Unreported, see Young 1988
Ranney Creek Cave site excavation, Coryell County, early 1930s	Unreported, see Prewitt 1974
Prehistoric site investigations by Frank H. Watt in the 1930s, including excavation of Aycock Rockshelter (or Kell Branch Shelter #1) in Bell County	Aynesworth 1936; Watt 1936; see also Stephenson 1985 and Lawrence and Redder 1985
Belton Reservoir preliminary survey by Robert Stephenson, late 1940s	see Shafer et al. 1964
Belton Reservoir survey and excavations, 1950s and 1960s	Miller and Jelks 1952; Shafer et al. 1964
Stillhouse Hollow Reservoir survey and excavations, early 1960s	Johnson 1962; Sorrow et al. 1967
Youngsfort site excavations, Bell County, 1960–1962	Shafer 1963
Hog Creek Reservoir investigations by Southern Methodist University, early 1970s	Larson et al. 1975; Larson and Kirby 1976
Hog Creek Reservoir investigations by the University of Tulsa, 1977	Henry et al. 1980
Early surveys of Fort Hood by the Fort Hood Archeological Society, 1960s and 1970s	Thomas 1978
Initial CRM surveys of Fort Hood by Science Applications, late 1970s	Skinner et al. 1981; Skinner et al. 1984
CRM surveys of Fort Hood by the Texas Archeological Survey, The University of Texas at Austin, early 1980s	Dibble and Briuer 1989; Dibble et al. 1989; Roemer et al. 1989
Historic research and remote sensing studies at Fort Hood, 1981	Jackson and Briuer 1989
CRM surveys and limited site testing at Fort Hood by Texas A&M University, 1980s–early 1990s	Carlson 1993c; Carlson et al. 1986; Carlson et al. 1987; Carlson et al. 1988; Carlson et al. 1994; Ensor 1991; Koch et al. 1988; Koch and Mueller-Wille 1989a, 1989b; Mueller-Wille and Carlson 1990a, 1990b; Thoms 1993
Analysis of military training impacts to archeological sites in West Fort Hood by Texas A&M University, 1981–1983	Carlson and Briuer 1986
Site testing at Fort Hood, by Texas A&M University Field Schools, 1990, 1991, and 1992	Carlson 1993a, 1993b, 1997
Geoarcheological studies of Fort Hood by Texas A&M University, 1989–1992	Nordt 1992, 1993
Development of NRHP significance standards for prehistoric sites on Fort Hood by Mariah Associates, 1993	Ellis et al. 1994
Intensive shovel testing of 571 prehistoric sites by Mariah Associates, 1991–1993	Trierweiler, ed. 1994
Edwards chert patination study by Mariah Associates, 1993–1994	Frederick et al. 1994
NRHP prehistoric site testing by TRC Mariah Associates, 1993–1994	Abbott and Trierweiler 1995a
Archeological investigation of Native American medicine wheel by Mariah Associates, 1994	Quigg et al. 1996
NRHP prehistoric site testing by TRC Mariah Associates, 1994–1995	Trierweiler 1996
NRHP prehistoric site testing by Prewitt and Associates, 1995	Mehalchick et al. 1999
NRHP prehistoric site testing by Prewitt and Associates, 1996	this report
*Some of the early investigations relate to an area approximately 100 km in diameter centered around Fort Hood, but most relate specifically to archeological investigations on the military reservation.	

greatly progressed since the inception of cultural resources management-related archeology after the passing of the National Historic Preservation Act of 1966, which established the National Register of Historic Places (NRHP). Significance testing for the NRHP was not rigorous during early archeological investigations at Fort Hood. By a process of trial and error over the past 30 years, evaluating sites for NRHP eligibility has become increasingly more formal, with a variety of research orientations, paradigms, and anthropological theories used at different times for measuring potential. Prehistoric sites are generally eligible for listing on the NRHP only if they meet Criterion D; that is, they have the potential to contribute information useful for answering research questions relevant to a research design. In recent years the archeological community has become more critical in deciding what the important research problems are for any given region and, more importantly, what types of archeological data are needed to address these problems. Prehistoric archeological research in Texas is slowly moving toward greater consistency through the development of regional historic contexts.

Fortunately, such a regional context has been developed for Fort Hood, making it easier for archeologists to make consistent assessments of prehistoric sites. In the early 1990s, Mariah Associates, Inc., conducted an intensive study aimed at developing a prehistoric research design for Fort Hood. In the resulting document, Ellis et al. (1994) determined that the simplistic cultural-historical perspective that has prevailed throughout the history of archeological research in Central Texas was not providing satisfactory results. Consequently, they created a new framework for evaluating NRHP eligibility of Fort Hood prehistoric sites that is both rigorous from a theoretical perspective and practical in terms of its implementation. This research design defines the ultimate goals of prehistoric archeological research at Fort Hood and establishes a set of NRHP significance standards as the new yardstick for judging the research potential of individual prehistoric sites. The Fort Hood research design defines four fundamental research domains that "address the basic issues which underlie archeological analysis" (Ellis et al. 1994:100). The research design takes the next step by identifying testable hypotheses that are categorized within a set of seven substantive

research domains. These research domains, which are ordered from simplest to most complex, provide meaningful questions that may be addressed using basic archeological knowledge and data sets established by the fundamental research domains. The ultimate goal is to begin modeling adaptive behavior based on the premise (or null hypothesis) that the prehistoric inhabitants of Fort Hood employed a foraging strategy. The fundamental and substantive research domains for Fort Hood archeological research are summarized in Table 2.

Within the substantive research domains, a series of 19 testable hypotheses are proposed; the types of archeological data needed to address these hypotheses are defined, and the test implications that determine when each hypothesis is falsified are discussed. While these hypotheses, data needs, and test implications must be made explicit to define research goals, they are not practical for evaluating sites based on small amounts of archeological data obtained from limited testing. To bridge this gap, Ellis et al. (1994) boil down these research domains into a "Significance Model for Fort Hood," a series of questions that must be answered after each site is tested. These questions relate back to the fundamental research questions in that they define the types and quality of archeological data that a site possesses. Data needs questions that must be addressed through prehistoric site testing are:

1. Does the site (or subarea) have the potential to contain intact and undisturbed assemblages of artifacts and/or features?
2. Does the site (or subarea) have the potential to contain chronological indicators?
3. Does the site (or subarea) have the potential for stratigraphically separated (i.e., buried) deposits in primary context?
4. Does the surface assemblage have evidence of primary lithic procurement and/or lithic reduction activities?
5. Do currently available technical procedures allow temporal separation of unstratified palimpsest assemblages?

**Table 2. Summary of fundamental and substantive research domains for prehistoric archeological research at Fort Hood**

Fundamental Research Domains	Chronological markers: ▾ temporally diagnostic artifacts ▾ geomorphic dating	Subsistence bases: ▾ flora ▾ fauna
	Paleoenvironmental research: ▾ paleoclimate ▾ paleotopography ▾ paleoecology ▾ paleoenvironmental synthesis	Technological apparatus: ▾ tool production ▾ tool use ▾ consumables in the technological system
Substantive Research Domains	1. Site function I: Identifying the apparatus of subsistence and nonsubsistence technologies	
	2. Site function II: Spatial organization of individual technologies	
	3. Stability and change in technology and subsistence	
	4. Identifying adaptations I: Temporally specific arrays of technologies and subsistence resource bases	
	5. Identifying adaptations II: Adaptive strategies	
	6. Fort Hood in regional context	
	7. Explaining adaptation and adaptive change	

6. Does the site meet any or all of the key data needs to test cultural hypotheses? Presence or absence of key data is determined by the following questions:

- ▾ Does the site contain prehistoric bone or shell specimens that can be identified and/or dated?
- ▾ Does the site contain prehistoric macrobotanical specimens that can be identified and/or dated?
- ▾ Does the site contain features that may contain economic and/or chronometric samples or that may imply economic activities?
- ▾ Does the site contain multiple and spatially separated features?
- ▾ Does the site contain burned rock features including middens or mounds?
- ▾ Does the site contain unique, unusual, and/or nonlocal artifact types, artifact materials, concentrations of artifacts, feature types, or constellations of these?

The archeological research must address each of these questions, in order, for each site investigated. Questions 1, 2, and 3 assess con-

textual integrity; question 6 assesses content integrity. Questions 4 and 5 pertain to sites with surficial (or very shallowly buried) cultural evidence only and need not be considered for sites with buried cultural deposits. For a site with buried deposits, the answers to questions 1, 2, 3, and 6 must all be yes to meet the requirements for NRHP eligibility. If the answer to any one of these four questions is no, then the site is considered to have a fatal flaw and is deemed ineligible for listing in the NRHP.

The model of site significance proposed by Ellis et al. (1994) helps researchers identify whether a site contains discrete, stratified layers of cultural occupation (or *gisements* as described by Collins [1995:374]). Archeologists must look for sites with sufficient context (i.e., containing stratigraphically discrete evidence of cultural occupation/use) and content (i.e., intact features, assemblages of associated artifacts, and datable and interpretable organic remains) to allow one to test hypotheses relating to cultural behavior. These types of archeological sites are worthy of being eligible for listing in the NRHP because they are likely to yield archeological data useful for addressing the prehistoric research problems identified for Fort Hood (Ellis et al. 1994:103–171).

# WORK ACCOMPLISHED AND METHODS OF INVESTIGATION

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The archeological research conducted by Prewitt and Associates (PAI) maintains consistency with the Fort Hood Cultural Resources Management Plan as defined by Jackson (1994a) and with previous prehistoric site investigations conducted by TRC Mariah Associates (Mariah). PAI adopted many of the same field and analytical methods developed by Mariah in compliance with Fort Hood directives. Preexisting methods and procedures in four main areas were wholly adopted or only slightly modified. First, PAI continued using the research contexts and specific assessment criteria developed by Ellis et al. (1994) for evaluating National Register significance (see Chapter 3).

Second, in terms of field implementation of the research design, PAI continued to employ the concept of "red flag" data sets. The limited site testing done in 1996 was designed to determine whether sites contain certain types of data that make them eligible for listing on the National Register of Historic Places (NRHP). Testing was terminated at each site once evidence was sufficient to identify the presence of red flag data sets. This limited level of testing does not generate large samples of material culture and features, nor does it adequately address the problem of establishing site boundaries for extensive open sites. While this level of investigation is less intensive than typically employed for NRHP testing in Texas, it follows Fort Hood's Cultural Resources Management Plan philosophy of minimizing the costs of evaluating large numbers of sites.

Lithic analysis and the identification of material sources is the third area where long-term consistency is critical. Previous researchers had begun to recognize relationships between the geographic distribution of many

distinctive varieties of Edwards cherts and their occurrence in prehistoric sites. Mariah developed a well-defined chert typology based on extensive field investigations and laboratory research using lithic samples collected from chert outcrops described by previous investigators during the archeological survey of the base and Mariah's resurvey of lithic resource procurement (LRP) sites (Frederick and Ringstaff 1994:125-181). This chert typology was then systematically tested, ultimately proving that it has considerable utility as a research tool. Fort Hood is the largest chert-rich area in Central Texas where lithic sources have been examined thoroughly; thus, Mariah's work provides a substantial foundation for beginning to address research questions relating to prehistoric utilization of lithic materials. PAI utilized the established chert typology (see Appendix F) as a baseline from which to begin its lithic material investigations.

Quality control for archeological field and laboratory investigations is the fourth area where continuity with previous research was maintained. PAI established its quality control program following the same basic procedures used by Mariah. Although some procedures and quality control forms were modified to more closely reflect the corporate structure of PAI, the quality control program is quite similar to Mariah's and results in a rigorous internal review of the consistency of archeological methods and data.

Each of these four topics is discussed in more detail in this chapter. In addition, this chapter summarizes the fiscal year 1996 site investigations and the wide range of archeological methods and procedures utilized by PAI during its Fort Hood prehistoric site testing program.



### **IMPLEMENTING NATIONAL REGISTER SIGNIFICANCE CRITERIA: RED FLAG DATA SETS**

The purpose of formal archeological testing was to assess the eligibility of 42 prehistoric sites for listing on the NRHP. Eligibility was evaluated according to the Fort Hood research design and the red flag site concept developed by Ellis et al. (1994). Red flag sites are identified as "sites which have a high probability of requiring further management attention" (Trierweiler 1994a:11). To implement NRHP significance criteria in the field, Mariah modified the red flag concept to include four red flag data sets. The presence of any one of these data sets, when encountered on a site-specific basis, immediately establishes a site as having a high research potential and as being eligible for listing in the NRHP. Abbott and Trierweiler (1995a:37) define the four red flag data sets as:

1. macroscopically visible organic remains (charcoal, bone, seeds, shell) in a primary, thin-bedded, and stratigraphically discrete context;
2. multiple and stratigraphically discrete cultural occupations with high chronometric potential, as evidenced by abundant charcoal or hearths with fired substrates or in situ burned rocks;
3. human bone found in undisturbed stratigraphic contexts; and,
4. buried Paleoindian or Early Archaic components in primary and nondisturbed contexts.

Red flag data sets 1 and 2 pertain directly to the issues of site content and context, as defined in the model of site significance for Fort Hood by Ellis et al. (1994) and summarized in Chapter 3. Red flag data set 3 recognizes the research potential of human remains in an intact archeological context. As originally used by Mariah, Red flag data set 4 was implemented because the Fort Hood research design has identified the Paleoindian and Early Archaic periods as major data gaps. No human remains were found in any of the 42 sites investigated in FY 1996.

Because the system of red flag data sets was employed, the overall level of effort for testing each prehistoric site was limited. The criteria of one or more of the three primary red flag data sets (excluding human remains) were often satisfied by only a few test units. This is particularly true for the open sites in alluvial settings where, even upon inspection of backhoe trenches, it was obvious that test units would produce evidence of organic remains and cultural materials in primary contexts associated with one or more stratigraphically discrete cultural zones.

Each site was reviewed prior to conducting test excavations, taking into account recommendations of the original excavators when possible. Because the overall testing effort was limited by the specifications of each of the three delivery orders, various levels of testing at individual sites were determined by distributing the overall effort (i.e., the number of trenches and total volume of hand-excavated units) according to the perceived testing goals for each site. Recommended levels of effort were approved by Fort Hood with a great deal of flexibility to reallocate effort based on actual field findings. Excavations at the 42 investigated sites consisted of 140 backhoe trenches and 188 test units (Table 3). Sixty-one analysis units were defined.

### **FIELD METHODS**

Formal testing of each of the 42 sites consisted of backhoe trenching and/or manually excavated test units. Mechanical excavations could not be undertaken on any site prior to inspection of the area by a representative from the Nature Conservancy of Texas, Natural Resources Branch (NRB). The purpose of this was to avoid impacting endangered species habitats or other protected areas. After checking site locations on Fort Hood military installation maps and corresponding aerial photo sheets and reviewing site sketch maps showing specific areas to be trenched, the NRB usually granted permission to proceed. In some cases, however, a field check by an NRB representative, accompanied by one of the archeological Field Supervisors, was necessary. Trenching was not conducted on 9 of the 42 sites (see Table 3). These sites, six of which are situated in Paluxy sediments, all had shallow deposits where backhoe trenching was not necessary to get good vertical exposures. Tank trails and erosional gullies often

Table 3. Summary of work accomplished

Site Number	Subarea Tested	Number of Backhoe Trenches	Number of Test Units	Number of Excavation Levels
<b>PALUXY SITES</b>				
41CV947	—	1	3	31
41CV984	—	0	5	26
41CV988	B	0	8	38
41CV1043	A	0	6	30
41CV1049	A	3	4	33
41CV1050	A	3	4	15
41CV1093	—	1	5	25
41CV1106	—	0	7	31
41CV1138	—	2	5	38
41CV1143	A	0	3	23
41CV1191*	—	1	6	47
41CV1194*	—	1	2	18
41CV1258	B	2	6**	59
41CV1283	B	0	2	8
Subtotals		14	66	422
<b>HOUSE-RIPSTEIN CREEK SITES</b>				
41CV578	A	5	4**	64
41CV1211	—	5	4**	66
41CV1218	—	2	1	10
41CV1219	B	9	4	49
41CV1221	A, B	3	5	39
41CV1222	—	6	5**	49
41CV1225	A	5	3**	28
41CV1235	—	6	5**	62
41CV1250	B	5	3**	33
41CV1269	A, B	8	4**	61
41CV1275	C	13	13	98
41CV1282	A	4	6	35
41CV1286	B, C	9	11	65
41CV1287***	A, B, C	0	6	23
41CV1308	B	2	1	16
Subtotals		82	75	698
<b>COWHOUSE-TABLE ROCK-COTTONWOOD CREEK SITES</b>				
41CV1012	B	0	2	11
41CV1030	—	13	10**	115
41CV1048	C	2	3	28
41CV1120	—	4	3	50
41CV1122	A, B	3	3	41
41CV1133	—	4	4	33
41CV1137	B	2	1	25
41CV1206	C	3	3	39
Subtotals		31	29	342
<b>OTHER OPEN SITES</b>				
41BL340	—	3	3**	46
41CV755	A	3	2	22
41CV957	B	2	3	31
41CV1092	—	0	4	21
41CV1152	A, B	5	6	41
Subtotals		13	18	161

Table 3, continued

Site Number	Subarea Tested	Number of Backhoe Trenches	Number of Test Units	Number of Excavation Levels
Totals		140	188	1,623

\* Site has a non-Paluxy component but primary component is in Paluxy sediments.

\*\* Site has some test units and/or levels that are smaller or larger than 1 x 1 m.

\*\*\* Site encompasses Paluxy-like sediments.

were more than sufficient for providing stratigraphic profiles. In all cases where trenching was deemed unnecessary, the test units provided sufficient data for determining NRHP eligibility.

Trenching on open sites was done to furnish exposures for interpreting depositional events, to assess site geomorphology, to prospect for buried cultural deposits, and to provide access to deeply buried components warranting manual excavation. The Directorate of Environment and Housing, Maintenance Division, Pavement Section at Fort Hood provided a backhoe and an extremely proficient operator. At least one of the two Field Supervisors or the Project Geomorphologist always accompanied the backhoe operator to monitor the trenching effort. Trench placement was based on the results of shovel testing, past and present investigators' observations (such as cultural materials noted in exposures), and the need for adequate coverage of the site area. Although mechanical (and manual) excavations were typically conducted within previously delineated site boundaries, in some cases these boundaries were restricted to a small portion of a landform extending hundreds of meters in one or more directions. At times, these circumstances necessitated excavating trenches beyond a previously defined site perimeter. In some cases, site boundaries were modified based on new subsurface finds. However, in no case was mechanical testing done specifically to establish site limits. The time and effort needed to conduct such a task are beyond the scope and goals of the current investigations.

All backhoe trench locations and dimensions were determined by the Field Supervisors in consultation with the Geomorphologist and/or the Project Manager. The trenches were numbered consecutively, and a wooden datum stake (e.g., BHT 1, BHT 2) was placed next to the corresponding trench. The Field Supervisor noted trench locations on the site sketch map and

recorded standardized information about each trench on a backhoe trench data form. Trench orientation was recorded as the direction of the long axis relative to magnetic north. Trench dimensions (length, width, and depth) were recorded in meters. The Geomorphologist profiled selected trench walls and described the strata on a geologic profile form. In cases where stratigraphic profiles were similar, only one or two trench profiles were recorded. Specific information regarding the methods used by the Geomorphologist to describe geological profiles is found in Appendix B. All trenches were inspected by the field personnel for cultural remains, and profiles were cleared to examine stratigraphy. When appropriate, diagnostic artifacts and special samples, such as charcoal and bulk soil samples, were collected. Each sample was given a specific sample number consisting of the first letter of the sample type followed by a number. For example, the first charcoal sample collected from a site was designated C1, the first flotation F1, and so forth. All similar types of samples were numbered consecutively and recorded on a sample inventory form.

Test units were excavated manually to sample buried cultural deposits, to afford exposures for stratigraphic interpretation, and to provide areal coverage of subsurface deposits across the site. Locations of test units were determined by the Field Supervisors in consultation with the Geomorphologist and/or the Project Manager. These decisions were contingent upon the trenching results, the previous investigators' observations, a general reinspection of the site area, and the results of shovel testing. In cases where test units were excavated adjacent to a backhoe trench, the unit's orientation corresponded to that of the trench. Isolated units generally were oriented to magnetic north, although there were circumstances where a non-standard orientation was more-conducive to

excavation. For example, units excavated along the edges of cutbanks or tank trails often were oriented relative to the natural or artificial exposure. Generally, test units measured 1x1 m, but size sometimes varied slightly when units were excavated adjacent to a tank trail or placed on the safety bench of a backhoe trench. Deviation from the standard size was most pronounced with test units placed on the safety benches of backhoe trenches. Such units typically measured 1 m long and 60–70 cm wide. Other exceptions include excavation of 50x50-cm units along backhoe trenches to sample sediments where no cultural evidence was observed or suspected, and excavation of slightly oversized units to remove entire or larger portions of features visible in backhoe trenches, cutbanks, or tank trails. In addition, some units were excavated as a 1x1-m unit until the bottom of the suspected cultural zones was reached, at which point the unit's size was decreased to a 50x50-cm to sample the deeper sediments.

As with the backhoe trenches, test units were numbered sequentially, beginning with the next available number if previous test units had been excavated at the site. All test units were excavated in arbitrary 10-cm levels, with the ground surface at the highest corner of each unit used as the datum for elevation control. In cases where test units were excavated on the safety benches of backhoe trenches or overburden was intentionally removed, the excavation levels were still numbered from the surface (e.g., a test unit excavation might begin with Level 12 at 110 cm below surface).

As a general rule, all of the hand-excavated fill from each unit was dry screened through ¼-inch-mesh hardware cloth. If present, samples of charcoal/diffuse ash and a maximum of 20 land snail shells were collected from each level. All cultural materials were collected except for unmodified mussel shell fragments lacking hinges (presence noted), burned rocks (grossly sized, counted, and weighed), and intrusive historic and modern items (presence noted). In a few cases where the upper levels of a test unit were determined to be sediments of recent origin by the Geomorphologist or were demonstrated to be culturally sterile sediments by other nearby excavations, these upper levels were removed as overburden without being screened.

An excavation record form was completed for each level of each test unit, and an artifact

frequency distribution summary form and inventory of field bags were filled out for every test unit. Selected profiles of test units, particularly those revealing features or cultural lenses in cross section, were drawn. If necessary for stratigraphic interpretation, isolated test units were described as geologic profiles by the Geomorphologist.

Feature investigations concentrated on subsurface features that were obviously intact. Surface features showing evidence of disturbance or displacement were not investigated. In cases where multiple buried features were encountered (e.g., in backhoe trenches or tank trails), time sometimes did not allow for all to be investigated. In these instances, features selected for investigation were those that offered the most resource potential (i.e., appeared to be most intact or had good organic preservation) and represented the broadest range of temporal/cultural components possible. Features were excavated and removed as discrete provenience units irrespective of arbitrary levels, while nonfeature matrix surrounding features was removed according to arbitrary levels and screened separately. Exceptions include midden and mound deposits (e.g., Feature 1 at 41CV1269 and Feature 2 at 41CV984), which were completely excavated in arbitrary 10-cm levels. A feature data form was completed for each feature, and plan and profile views were drawn. Whenever possible, separate charcoal samples were taken. In many cases, all of a feature's matrix was removed as a flotation sample. The size of individual flotation samples, contingent on feature size and type of fill, ranged from 0.5–100.0 liters, but the most common size was ca. 7 liters. If only a portion of the feature was sampled, the remaining matrix was screened through ¼-inch-mesh hardware cloth. When special samples such as flotation or charcoal were taken from features, they were assigned specific sample numbers and listed on sample inventories. The Field Supervisor noted test unit locations on the site sketch map and recorded excavation progress on daily journal forms. When necessary, a general data form was used for recording additional excavation information or daily notes.

Whenever possible, test units were excavated to bedrock, abundant gravels, large immovable rocks, deposits that were not culturally relevant in age, or combinations thereof.

However, at some sites containing Holocene deposits greater than 2–3 m, test excavations were terminated at an arbitrary depth at or below the maximum depth of cultural materials observed in trenches or other exposures.

Each site and its excavations were photographed and videotaped. Black-and-white print and color slide photographs were taken to document all phases of the investigations, including site and area overviews, backhoe trench and test unit profiles, cultural features, and other unusual archeological remains. The documentation of site excavations on videotape fulfilled a contractual obligation required by Fort Hood.

All sites were mapped using an electronic (Sokkia) total station, but mapping was concentrated on subareas that were tested. Subareas not tested were only partially mapped or completely excluded. A permanent site datum marked by a rebar in the ground was established at each site and assigned an arbitrary elevation of 100 m. All topographic data are relative to these datum points. Every site map includes the natural topography, cultural features visible on the surface, all mechanical and manual excavations, natural and manmade landmarks, and a site or subarea boundary based on the known or suspected spatial limits of surface or buried deposits. The Geomorphologist drew cross sections of some open sites depicting the various geomorphic surfaces and associated depositional units.

During the course of the test excavations, records and maps were reviewed by the Field Supervisors for consistency and quality. Records were periodically reviewed by the Project Manager and the Quality Control Officer (see Quality Control below).

The final field task consisted of backfilling all test excavations. Each backhoe trench and all accessible test units on open sites were filled in by the backhoe. An archeologist accompanied the operator and monitored the process. Test units that could not be reached by the backhoe were backfilled manually by the archeologists.

Once fieldwork was completed, the Field Supervisor who oversaw the test excavations, along with the Geomorphologist, wrote a preliminary site report for each of the 42 tested sites. These reports were reviewed by the Project Manager and subsequently submitted, along with corresponding attachments and videotape, to the Fort Hood Staff Archeologist.

## LABORATORY METHODS

Before fieldwork began, a thorough review was made of the methods and standards required by the Fort Hood Cultural Resources Management Program for laboratory processing and curation of the collections from the three delivery orders. All artifact and material collections also were processed and curated according to federal curation guidelines, Council of Texas Archeologists standards, and current curation and conservation standards. A Laboratory Manual outlining the procedures to be used and the standards to be met was created.

All of the collections were organized, processed, and curated by site. Collections from different sites were not intermingled at any stage of processing. As artifacts and samples were brought in from the field, they were organized by provenience and were checked against the inventory of field bags and the sample inventory form completed by the excavators in the field for any problems or inconsistencies with the provenience information. If a problem was noted, it was corrected by referring to other excavation records or by consulting with the Field Supervisor. Collection bags were also checked for special information/instructions (e.g., notations of fragile materials), and these materials were handled accordingly.

Once the field bags were checked, the materials were taken to the wet lab for cleaning. The artifacts were removed from the bags and checked for artifact type to determine appropriate cleaning methods. Some artifact categories, such as bone, charcoal, and vegetal matter, were finger- or dry-brushed rather than being cleaned with water. Other artifacts were cleaned using tap water and occasionally a soft toothbrush. After cleaning, artifacts were placed on a drying rack and allowed to thoroughly air dry before being cataloged.

For some of the lithic materials, it was necessary to remove calcareous deposits that would hinder analysis. This was done using a 5 percent solution of hydrochloric acid in water. Each artifact was soaked for 10 minutes in clear tap water and then soaked in the HCl solution until the majority of the effervescence ceased. The artifact was then soaked in clear tap water for at least 30 minutes to remove any remaining acid from the lithic surface. A list of the artifacts that received this treatment is included in

the project records.

The artifacts were then bagged by material type within provenience designation. Each group of provenienced artifacts was assigned an accession number, which is a unique provenience-specific number. A specimen inventory, organized by site and in accession number order, was compiled with each artifact type listed under its assigned accession number. Recorded on the specimen inventory were the accession number, associated provenience data, the name of the excavator(s), the date of excavation, any other information recorded on the field bag, and the type and quantity of artifacts recovered. For some material categories, such as charcoal, a weight (usually in grams) was recorded rather than a count.

All categories of artifacts were cataloged with the site number and accession number. Lithic tools also were assigned unique specimen numbers within each accession number. When assigned, this number was added after the accession number on the artifact. Artifacts received a base coat of PVA (a 10 percent solution of Polyvinyl Acetate Resin-AYAT in acetone). When dry, the site, accession, and specimen numbers were recorded using a rapidograph pen. This catalog number was then covered with a top coat of PVA.

Each artifact type was placed into a 4-mil polyethylene ziplock bag. Archival curation tags documenting the name of the project, project number and date, site number, provenience data, accession number, artifact type, and the number of specimens (or weight) were placed into 1.5-mil polyethylene bags and placed within each artifact bag. Artifacts were grouped by artifact types or subtypes if appropriate. For example, projectile points were bagged by type name rather than as one unit.

Flotation samples were processed using the Flote-Tech flotation system, which provides a multimodal method of separating materials in a sediment sample. The flotation process resulted in a light fraction, utilized for special analyses such as macrobotanical, and a heavy fraction that was checked for artifacts larger than ¼ inch. Roots and unmodified rocks were removed and discarded. Any artifacts found were processed following the procedures outlined above.

Like the artifact collections, all of the photographic materials were organized by site.

Black-and-white photographs and negatives were checked against the photo logs to ensure that frame numbers and captions correlated and that the recorded information was accurate. The contact sheets were labeled on the back with project number, site number, photo number, roll number, and frame number. The negatives were labeled with project, site, and photo numbers. A 3x5-inch print was made from each negative; these also were labeled with project, site, and photo numbers, as well as a caption. Color slides were checked against the photo log to ensure that the frame numbers and captions correlated and that the recorded information was accurate. Each slide was labeled with project name and number, site number, slide number, and caption. All of the photographic materials were placed into the appropriate archival holders. Videotapes of site investigations were labeled with project name and number, site number, and appropriate provenience information.

All forms and records used in the field and the lab were printed on archival paper and filled out in pencil. The exception to this is that some field maps drawn on nonarchival grid paper; these were later treated in the lab with a deacidification solution. All field, lab, and analysis records were organized by project and then by site. Records were grouped by categories such as daily journal notes, testing forms, feature forms, specimen inventories, etc. The only exception is that all photographs were curated as a unit, with all of the black-and-white photographs together and all of the color slides together. All written and photographic materials were placed in archival folders, archival record boxes, and archival curation boxes. An inventory detailing contents was included with each curation box. Curated photographic records also contain a computer-generated copy of the photo log, a cross-referenced photo log organized by site, and a disk copy of the computerized photo logs.

## **ANALYTICAL METHODS**

Analyses of material culture (see Chapter 10) varied considerably depending upon the class of artifacts being analyzed, the number of specimens within each artifact class, and the specific goals of the analysis of each class. The material culture classification scheme employed during this analysis is outlined in Table 4. Artifacts were grouped first by type of material (e.g., stone,

**Table 4. Classification of material culture**

<b>CHIPPED STONES</b>	
<ul style="list-style-type: none"> <li>▾ Arrow Points <ul style="list-style-type: none"> <li>named type</li> <li>untyped</li> <li>untypeable fragment</li> <li>preform</li> </ul> </li> <li>▾ Dart Points <ul style="list-style-type: none"> <li>named type</li> <li>untyped</li> <li>untypeable fragment</li> <li>preform</li> </ul> </li> <li>▾ Perforators</li> <li>▾ Gouges <ul style="list-style-type: none"> <li>unifacial</li> <li>bifacial</li> </ul> </li> <li>▾ Bifaces <ul style="list-style-type: none"> <li>early/middle stage</li> <li>late stage/finished</li> <li>miscellaneous bifaces</li> </ul> </li> <li>▾ Unifaces <ul style="list-style-type: none"> <li>end scraper</li> <li>side scraper</li> <li>end/side scraper</li> <li>other scraper</li> <li>miscellaneous unifaces</li> </ul> </li> <li>▾ Spokeshave</li> <li>▾ Cobble tools</li> </ul>	<ul style="list-style-type: none"> <li>▾ Gravers/Burins</li> <li>▾ Core Tools</li> <li>▾ Multifunctional Tools</li> <li>▾ Edge-modified Flakes</li> <li>▾ Cores</li> <li>▾ Unmodified Debitage</li> </ul>
<b>GROUND AND BATTERED STONES</b>	
	<ul style="list-style-type: none"> <li>▾ Manos</li> <li>▾ Metates</li> <li>▾ Mano/Hammerstones</li> <li>▾ Hammerstones</li> <li>▾ Other ground stones</li> <li>▾ Indeterminate fragments</li> </ul>
<b>BURNED ROCKS</b>	
	<ul style="list-style-type: none"> <li>▾ fire cracked</li> <li>▾ heat spalls/shatter</li> </ul>
<b>FAUNAL REMAINS</b>	
	<ul style="list-style-type: none"> <li>▾ Vertebrate <ul style="list-style-type: none"> <li>modified bones</li> <li>unmodified bones</li> </ul> </li> <li>▾ Invertebrate <ul style="list-style-type: none"> <li>modified shells</li> <li>unmodified shells</li> </ul> </li> </ul>
<b>MACROBOTANICAL REMAINS</b>	

bone, shell, or other organics). Within each material group, artifacts were further classified into morphological/functional classes and subclasses. Systematic observations of selected attributes were defined for different classes of artifacts. Within each class, each specimen was analyzed individually and its specific attribute data were recorded on a computer coding form and entered into the computer database (see Data Manipulation below). The detailed attributes recorded for stone artifacts, the most abundant artifact type recovered, are summarized in Table 5. For smaller artifact classes, such as modified bones or shells, specimens are described individually but detailed attributes were not recorded in the database.

The remainder of this section defines the various artifact classes and subclasses, the attributes that were recorded for stone artifacts, and the method of manipulating the material culture data. Attributes recorded for all nonlithic artifacts are described in the appropriate sections of the material culture chapter (see

Chapter 10).

### Definitions of Artifact Classes

The artifact classification and attribute analysis systems employed in FY 1996 are simplified versions of the detailed artifact classification used by PAI during the FY 1995 prehistoric site testing (Mehlich et al. 1999: Table 5). They also generally correspond with the artifact analyses previously conducted by TRC Mariah (Abbott and Trierweiler 1995a:56–68; Trierweiler 1996:54–63) and with general morphological descriptions of chipped and ground stone artifacts by Turner and Hester (1993). In this analysis, more emphasis is placed on simple morphological groupings of artifacts rather than on inferring tool function derived from detailed analyses of flaking technology and use wear. This streamlined approach is justifiable given the inadequate sizes of site-specific artifact samples in this study and the inherent limitations of behavioral interpretations that may be derived

**Table 5. Summary of attributes recorded for stone artifacts**

Attributes Recorded	Arrow/Dart Points	Unmodified Debitage	Chipped Stone Tools	Ground Stone Tools
Site and accession (lot) numbers, and provenience data*	x	x	x	x
Type name	x			
Tool class or subclass	x		x	x
Raw material	x	x	x	x
Chert type	x	x	x	
Completeness	x	x	x	x
Cortex**		x	x	
Patination**	x	x	x	
Heated**	x	x	x	x
Size (by groups)		x		
Maximum length (mm)	x		x	x
Maximum width (mm)			x	x
Maximum thickness (mm)	x		x	x
Blade length (mm)	x			
Blade width (mm)	x			
Haft length (mm)	x			
Neck width (mm)	x			
Base width (mm)	x			
Comments***	x	x	x	x

\* Provenience data recorded include backhoe trench or test unit number, excavation level, elevation or centimeters below surface (for piece-plotted specimens), feature association, flotation sample number, surface collection, etc.

\*\* Presence and absence or degree of this trait were noted.

\*\*\* Comments field was used for additional observations.

from such data.

### ***Chipped Stone Artifacts***

Arrow and dart points are functional groupings that denote stone artifacts probably used to tip projectiles. They are generally characterized as bifacially (sometimes unifacially) flaked specimens with a triangular to leaf-shaped blade section, a sharply pointed distal end, and sharp lateral blade edges. The distinction between arrow and dart points is one of size, with arrow points generally having a smaller blade and neck (or stem) width (the latter generally less than 8 mm for arrow points). When possible, arrow and dart points were further classified by named types (e.g., Pedernales and Scallorn) defined in archeological literature. Specimens that could not be assigned to a named type are classified as untyped, complete or nearly complete points

that do not conform to any specific type; untypeable fragments, points that are too incomplete to be typed; or preforms, usually triangular specimens that represent a late stage of point manufacture but lack diagnostic finishing attributes such as notches. All projectile points were assigned to types by Elton Prewitt.

Perforators are characterized as having a relatively long and tapered projecting bit with a diamond-shaped biconvex or planoconvex transverse cross section. They generally exhibit use-related microflaking on both faces of each edge or on alternate faces of opposite edges; polish and rounding are often evident on the blades as well. The bases of perforators may be unmodified flakes, unifaces, bifaces, or projectile points reworked into perforators. As a functional group, perforators are thought to have been used primarily for drilling or poking holes through various materials. No distinction is made between fine-tipped perforators that are commonly called drills and broad-tipped specimens often called reamers.

Gouges are triangular or trapezoidal specimens with planoconvex transverse and longitudinal cross sections. They may be unifacially or bifacially flaked but have straight to concave, steeply beveled working edges; use polish and microflaking are concentrated primarily on the tool's ventral face. Use wear studies indicate that some gouges were probably hafted tools that functioned in a similar manner to modern-day planes or adzes. As used in this analysis, gouges also include tools that some lithic analysts classify as wedges. Some of the Fort Hood specimens conform to the Clear Fork varieties (unifacial and bifacial) of gouges as defined by Turner and Hester (1993:246–249).

Bifaces include all varieties of bifacially flaked tools that are not included in other classes (i.e., projectile points, perforators, or gouges). Bifaces are grouped into three subclasses used in the same manner as defined by Mariah



(Abbott and Trierweiler 1995a:60–61; Trierweiler 1996:56–57): (1) early/middle-stage bifaces; (2) late-stage/finished bifaces; and (3) miscellaneous bifaces. The first two subclasses represent different stages of the biface reduction sequence recognized by Callahan (1979), Collins (1975), Sharrock (1966), and others. Early/middle-stage bifaces approximate Callahan's Stages 2 and 3, Collins's initial trimming into primary trimming, and Sharrock's Stages 1 and 2. They have moderate to considerable amounts of cortex remaining and may have isolated knots resulting from inadequate flake removals. The edges are irregular and exhibit no clear central plane when viewed on end. Late-stage/finished bifaces approximate Callahan's Stages 4 and 5, Collins's primary trimming into secondary trimming, and Sharrock's Stages 3 and 4. They are characterized by few or no remnants of cortex, sinuous to straight edges centered on a longitudinal plane when viewed on end, and a well-defined outline shape. Some of the Fort Hood late-stage/finished bifaces conform to named types of tools, such as the Friday, Guadalupe, or San Gabriel bifaces described by Turner and Hester (1993:253, 256–258, 273). Finished bifaces generally have a clear ovate to triangular outline shape and include tools that are often called knives. No attempt was made to differentiate between bifaces that represent finished tools or were utilized (such as knives) and unused tools or manufacturing failures.

The miscellaneous biface subclass is a catch-all group that includes bifacially worked specimens that are too fragmentary or too irregular to be classified as early/middle-stage or late-stage/finished bifaces. Miscellaneous bifaces may include specimens that functioned as scrapers or knives, or in other capacities.

Unifacial specimens are classified into six subclasses as follows: (1) end scrapers, (2) side scrapers, (3) end/side scrapers, (4) other scrapers, (5) spokeshaves, and (6) miscellaneous unifaces. These subclasses are recognized by the morphology and location of unifacial retouch and/or use wear relative to the flake on which the tool is made. End scrapers have significant retouch and/or use wear along their distal edges, side scrapers have one or more worked and/or worn lateral edges, and combination end/side scrapers have characteristics of both. These scrapers, particularly end scrapers, may exhibit evidence of hafting in the form of scarring or

polishing on ventral ridges or proximal lateral edges. Other scrapers are unifacially worked implements with two or more retouched working edges that do not conform to the standard morphology of the end, side, or end/side scraper subclasses (e.g., a round scraper with its entire circumference serving as a working edge). Miscellaneous uniface is the catchall group for any unifacial tool that does not fit into another subclass. Miscellaneous unifaces include specimens that are irregularly shaped and/or have minimal unifacial working and retouch.

Spokeshaves are small flake tools with a worked concave edge that may have functioned as a plane to shave wood off of round sticks or shafts. The notchlike indentation may have been produced bifacially or unifacially. Spokeshave notches produced on other bifacial or unifacial tools (e.g., on an end scraper) are classified as multifunctional tools.

Cobble tools are unifacially or bifacially flaked implements made on cobbles or pebbles. Cobble tools exhibit extensive step fracturing, edge rounding, and polish indicative of heavy wear. Large cobble tools are often called choppers and were probably used as hammers for heavy battering and crushing.

Gravers/burins are flake tools with one or more carefully chipped beaklike protrusions. They probably represent specialized tools used for fine cutting and engraving. Unifacial and bifacial tools with graver tips are classified as multifunctional tools. Burins probably functioned in a manner similar to gravers (i.e., for cutting and engraving) but were made by striking off a flake so that it ran along a flake or tool edge. This different technique leaves a very strong steep, or right-angle, edge where the flake was removed.

Core tools are cores (see below) that have had one or more edges subsequently modified, either intentionally prepared as a working edge or altered through use. These tools are likely cores that were picked up and used as scraping or battering tools. The primary distinction between core tools and cobble tools is that the former originally functioned as cores before being made into or used as a tool while the latter did not.

Multifunctional tools are artifacts that appear to have been intentionally manufactured for and used in the performance of two or more functionally distinct tasks. Multifunctional tools

may include artifacts that fall into two or more of the other artifact classes. For example, an end/side scraper with a spokeshave notch or graver beak would be classified as a multifunctional tool rather than as a spokeshave or graver.

Edge-modified flakes are flakes with one or more edges that exhibit very minimal retouch and/or use wear. These expedient tools were used with little or no preparation. Edge-modified flakes include tools that some lithic analysts call utilized flakes or minimally retouched flakes.

A core is a chipped stone that has had flakes removed, but its primary function was as a source of flakes. Cores exhibit no evidence of use, and the original intent of the flake removals was to produce a tool.

Unmodified debitage consists of flakes that exhibit no evidence of having been further modified or utilized. For analytical purposes, unmodified flakes were classified as complete, proximal fragments, chips (medial or distal fragments), and chunks (angular fragments). While the amount of cortex present on flakes was recorded (see below), no attempt was made to define flakes according to their inferred reduction stage (such as biface thinning flakes, notching flakes, or unifacial manufacture/resharpening flakes). Prior to coding attributes, unmodified flakes also were passed through a series of standard-sized sieves and sorted into the following size categories: <0.25 inch, 0.25–0.5 inch, 0.5–1.0 inch, 1.0–1.5 inches, 1.5–2.0 inches, and >2.0 inches.

#### **Ground and Battered Stone Artifacts**

Ground and battered stone tools are classified into the following groups: manos, metates, mano/hammerstones, hammerstones, other ground stones, and indeterminate fragments. Manos are hand-held stones used for grinding and generally have one or two ground faces (i.e., unifacial or bifacial grinding). Metates are milling slabs on which manos were used; they encompass a range of different forms and sizes. Mano/hammerstones functioned primarily as manos but also exhibit evidence of battering along one or more edges. Hammerstones are rocks that exhibit evidence of extensive battering on one or more edges; most hammerstones are water-worn cobbles that often have heavy battering on their ends. The precise function of hammerstones is not always clear, but most specimens are thought to represent percussion

hammers used in knapping other stone tools. Other ground stones is a catchall class that may include a variety of tools such as anvils, abrasers, pestles, nutting stones, and modified hematite. Indeterminate fragments are pieces of ground stone too fragmentary to identify their form or function. Morphologically distinctive ground stone tools are discussed individually in the artifact descriptions (see Chapter 10).

#### **Burned Rocks**

Burned rocks is a catchall category that includes all nonchert rocks (primarily limestone) exhibiting such evidence of heating as thermal discoloration (e.g., reddening or blackening), angular fractures (e.g., "fire-cracked rocks"), or spalling. All thermally altered rocks were examined and quantified in the field (i.e., sorted by size and weighed) and then discarded if no other modifications were observed. The distributions of burned rocks within sites are discussed under each site module, but the burned rock data were not entered into the computerized artifact database. Many burned rocks are directly associated with heating/cooking features and even nonfeature burned rocks are considered to have been heated intentionally and were probably used as heat-retaining stones in a heating/cooking feature at one time.

In the field, burned rocks were sorted into the following size categories (based on maximum dimension) before being counted and weighed: <5 cm, 5–15 cm, 15–25 cm, 25–35 cm, and >35 cm. In the text, the term fist-sized refers to rocks in the middle of the 5–15 cm range, ca. 10 cm in maximum dimension. The terms slab and tabular refer to burned rocks that are rectangular in cross section and reflect their origin as broken pieces of layered limestone bedrock. In contrast, stream-rolled cobbles are more rounded and often have a well developed cortex layer. Blocky burned rocks are angular fragments that resulted from heat fracturing. In many cases, the burned rocks are heavily fossiliferous, denoting the fact that their origin may be traced to specific limestone layers where fossils are abundant. It is not always clear where the local source(s) of the fossiliferous rocks are found, but the observations are important for future research. At Paluxy sites, for example, a high frequency of fossiliferous rocks is often found in burned rock features. These rocks appear to have

originated from Glen Rose outcrops downslope, as opposed to Walnut Clay outcrops upslope.

Chert rocks that exhibit evidence of moderate to intensive heating but no flake attributes are classified as heat spalls and/or shatter. Since chert generally shatters and spalls (often in violent explosions) upon intensive heating, most heat spalls and shatter probably represent materials that were heated accidentally (e.g., chert debris discarded into a fire or a fire pit dug into a chert-rich zone).

### ***Faunal Remains***

Faunal remains include vertebrate and invertebrate remains and are classified as unmodified or modified. Vertebrate faunal remains were analyzed by Barry Baker (see Appendix D). Depending upon their archeological context and other factors, unmodified bones are considered to represent either discarded remains of animals that were killed by humans or remains that were deposited in sites as a result of natural processes. Unmodified bones are specimens that exhibit no evidence of intentional modification, but may include bones that were modified incidentally or accidentally by humans. These modifications (e.g., bones that exhibit spiral fractures and/or cut marks resulting from butchering an animal) are often the result of human activities, but are recorded as attributes of unmodified bones rather than as modified bones. Modified bones are specimens that were intentionally cut, ground, or otherwise altered in the process of manufacturing a tool or ornament. Modified bones may also include specimens that exhibit use wear and were used as expedient tools.

Invertebrate faunal remains encountered during prehistoric site testing include land snail shells and freshwater mussel shells. Snail shells, primarily various species of *Rabdotus*, are ubiquitous in cultural deposits at Fort Hood but are believed to occur naturally. It is likely that organic-rich detritus in habitation sites attracted the snails. Consequently, the presence and abundance of snail shells was always noted in excavation records, but only a sample was collected from any given provenience (e.g., excavation level or cultural feature) for possible radiocarbon dating and/or amino acid racemization studies. Mussel shell valves and fragments also were abundant in the cultural zones at many sites,

but they are generally thought to represent materials introduced by humans. Although the majority of shells found in archeological contexts represent the discarded by-products of eating mussels, some shells were modified to make tools and ornaments. All unmodified mussel shell valves with an umbo (whole or partial) were collected; other fragments were discarded in the field. Mussel valves or shell fragments with evidence of intentional modification, such as cut edges or drilled holes, were collected and are considered to be artifacts. Discolored and/or calcined shells indicate that shells were being heated intentionally, perhaps to remove the mussels, or burned accidentally, possibly being discarded into fires.

### ***Macrobotanical Remains***

Samples of macrobotanical remains, primarily charred wood and sediments containing macrobotanical remains (i.e., flotation samples), were taken from cultural sediments. The presence, absence, and/or abundance of macrobotanical remains is discussed for individual sites (see Chapters 6–9), but their occurrence was not entered into the computerized artifact database. A detailed analysis of macrobotanical remains from selected sites is presented in Appendix E.

### ***Definitions of Stone Artifact Attributes***

Aside from provenience data and classificatory attributes (e.g., named point types and artifact classes), other attributes recorded for stone artifacts consist of subjective observations and objective measurements of metric data. The subjective attributes include identifications of raw materials and chert types, assessments of artifact completeness, and presence or absence of cortex, patination, and evidence of heating. Objective, or metric, attributes consist of measurements (in millimeters) used to characterize individual specimens. When appropriate, comments regarding nonstandard attributes or observations for individual specimens were added to the database.

### ***Raw Materials and Chert Types***

Raw material types identified among the chipped, battered, and ground stone artifacts are chert, quartzite, limestone, sandstone, and

hematite. Specimens identified as chert consist of opaque to partially translucent cryptocrystalline or microcrystalline materials. Fine-grained cherts lack visible crystalline structure, have weak to moderate luster, and are partially translucent; coarse-grained cherts have visible crystalline structure, an opaque appearance, and a generally grainy fill. Quartzites are metamorphic rocks consisting mainly of recrystallized quartz. Most recovered quartzite specimens are characterized by fine-grained crystalline structures and a reddish purple color.

Various types of Cretaceous limestones (carbonate-rich, fine-grained sedimentary rocks) are the most abundant rocks found in cultural deposits at Fort Hood (see burned rocks). No attempt to sort out different types of limestones was made in the field or in the laboratory, but field excavators did note the approximate frequencies of fossiliferous vs. nonfossiliferous limestones in many cultural features and sites. Some varieties of sandstone, fine- to coarse-textured sand grains cemented by silica and/or carbonates, are found in the Cretaceous limestone deposits in the Fort Hood area. In contrast, other types of sandstone appear to be nonlocal in origin (i.e., derived from areas outside the post).

Hematite nodules—iron oxide concretions in advanced stages of weathering—occur naturally in Paluxy sediments. Most hematite nodules found in Paluxy sites were not modified, are considered natural, and were not collected; however, occasional pieces have flat faceted surfaces exhibiting striations. These nodules were presumably ground to obtain red pigment, and red staining was found on some ground stones.

All chert specimens, regardless of artifact class, were compared with the established Fort Hood chert typology. Given the importance of Central Texas as a chert resource area for local and extraregional use (Shafer 1993:55), a great deal of attention has been devoted to developing a typology of the chert resources present on Fort Hood (Abbott and Trierweiler 1995b; Dickens 1993a, 1993b; Frederick and Ringstaff 1994). The Fort Hood chert typology established by previous researchers was employed in this study and is summarized in Table 6. Detailed descriptions of these chert types are presented in Appendix F.

### ***Completeness***

Each stone artifact is described as complete,

nearly complete, a proximal fragment, a medial fragment, a distal fragment, an edge fragment, an indeterminate fragment, or a barb. For incomplete specimens, no attempt was made to interpret the nature of the breakage (e.g., manufacture vs. use breaks).

### ***Cortex***

The amount of cortex present on any given chipped stone artifact provides evidence of the raw material source and often reveals much about the stage of manufacture. The amount of cortex present on each individual chipped stone artifact was recorded as 0 percent, 0–50 percent, 50–99 percent, or 100 percent. No attempt was made to describe different types of cortex.

### ***Patination***

The degree of patination on chert artifacts was noted as being none, light, or heavy. Patination is the complex weathering process by which cherts develop a colored rind around their exterior surfaces. With respect to Central Texas cherts, Frederick et al. (1994:6) use the term patina to refer to the weathering rind that is visible in petrographic thin sections and is “white or light gray to the unaided eye.” Patination is a time-dependent process and can be used in a gross fashion as an age indicator, although the absence of patination means nothing about an artifact’s age. Unfortunately, there are too many variables involved in the chemical process of patination to derive meaningful chronological interpretations based on variations in the degree of patina.

### ***Heating***

Artifacts that exhibit evidence of low- to moderate-intensity heating, such as slight discoloration, reddening, and a glossy surface texture, may have been intentionally heat treated. In cases where artifacts were intensively heated, as evidenced by heat spalling, fracturing, or crazing, it is likely that the heating was accidental. Distinguishing between intentional and accidental heating is subjective, however. For this analysis, degree of heating was recorded as none, low, or high for all stone artifacts. The majority of chert specimens that were heated show evidence of low- to moderate-intensity heating and are

**Table 6. Fort Hood chert types**

Type Number	Type Name	Abbreviation
1	Heiner Lake Blue-Light	HLB-LT
2	Cowhouse White	CW
3	Anderson Mountain Gray	AMG
4	Seven Mile Mountain Novaculite	SMN
5	Texas Novaculite	TN
6	Heiner Lake Tan	HLT
7	Fossiliferous Pale Brown	FPB
8	Fort Hood Yellow	FHY
9	Heiner Lake Translucent Brown	HLTB
10	Heiner Lake Blue	HLB
11	East Range Flat	ERF
13*	East Range Flecked	ER FLECKED
14	Fort Hood Gray	FHG
15	Gray-Brown-Green	GBG
16	Leona Park	LP
17	Owl Creek Black	OCB
18	Cowhouse Two Tone	CTT
19	Cowhouse Dark Gray	CDG
20	Cowhouse Shell Hash	CSH
21	Cowhouse Light Gray	CLG
22	Cowhouse Mottled with Flecks	CMF
23	Cowhouse Banded and Mottled	CBM
24	Cowhouse Fossiliferous Light Brown	CFLB
25	Cowhouse Brown Flecked	CBF
26	Cowhouse Streaked	CS
27	Cowhouse Novaculite	CN
28	Table Rock Flat	TRF
29	indeterminate white	-
30	indeterminate yellow	-
31	indeterminate mottled	-
32	indeterminate light gray	-
33	indeterminate dark gray	-
34	indeterminate light brown	-
35	indeterminate dark brown	-
36	indeterminate black	-
37	indeterminate blue	-
38	indeterminate red	-
39	indeterminate nonlocal	-

\*No Type 12 was assigned.

thought to represent intentionally heated, or heat-treated, pieces.

#### ***Metric Attributes***

For most stone tools the only measurements taken were maximum length, width, and thickness. For projectile points the standard measurements taken were maximum length, blade length, blade width, haft width, neck width, base

width, and maximum thickness. All measurements were taken in millimeters with digital calipers and read to one-tenth of a millimeter.

#### **Data Manipulation**

After coding the artifact data onto coding sheets, the data were entered into a computerized database for manipulation. The software used to code and analyze the data is MICROSOFT ACCESS 7.0 for WINDOWS 95.

#### **QUALITY CONTROL PROGRAM**

To ensure that a high standard of quality was maintained, a Quality Control (QC) program established procedures for conducting periodic independent reviews of the work. The primary objectives of the QC program were (1) to establish a system of communication to ensure that responsibilities and job descriptions of various project personnel were clearly understood and followed; (2) to maintain consistency among individual site investigations conducted under all delivery orders and among different field seasons; (3) to maintain a high quality of work by establishing a process for periodic review of all phases and aspects of field, laboratory, and analysis work

by a company employee not directly involved with the project; and (4) to ensure that National Register criteria were being uniformly applied and that site evaluations were conducted in a consistent and replicable manner. The QC program generally followed the program previously established by Mariah for their intensive shovel testing program (Trierweiler, ed. 1994:92-95) but was modified to meet the specific requirements of the testing and evaluation phase.

To meet the first two objectives stated above, PAI prepared two procedures manuals outlining the methods and standards of archeological field and laboratory/analytical work; these were used throughout the project. The *Field Procedures Manual for Archeological Testing and Evaluation at Fort Hood, Texas*, outlines the duties and responsibilities of all key project and field personnel, including crew members. It describes the field methods and techniques employed and presents examples of standard data forms used in the field (e.g., excavation record forms, photo logs, and backhoe trench profile forms). In addition, this field manual implemented the following procedures to help maintain high-quality archeological data recovery:

1. Field orientation and methods training for all archeological field personnel.
2. Daily review of all field records by Field Supervisors to ensure completeness and consistency.
3. Standardization of all aspects of archeological investigations (e.g., artifact and feature terminology, artifact typologies, recognition and interpretation of natural and cultural stratigraphy, methods for establishing site chronology, and consistency and comparability of site maps and excavation records).
4. Periodic meetings of all field personnel to ensure standardization of methodology among crews.
5. Rotation of field crew members as needed to ensure continuity through each field season and to maintain an adequate level of experience on all crews.
6. Preparation and review of special field record forms to standardize archeological data recording for the project.

The *Laboratory and Analysis Procedures Manual for Archeological Testing and Evaluation at Fort Hood, Texas*, outlines the duties of all key project and laboratory personnel, including lab assistants. It also describes standard

laboratory and data analysis procedures and presents examples of the standard forms used in the lab (e.g., artifact and sample inventory forms).

Each employee involved in field or laboratory/analysis work was given a copy of the appropriate procedures manual prior to beginning work. One or more key project personnel discussed the manual with employees on an individual or group basis to ensure that the procedures were being effectively communicated.

Safety issues in the field and the lab were also a primary concern. Safety issues are discussed in both the field and laboratory procedures manuals and were stressed by all key project personnel.

To meet the third and fourth objectives mentioned above, a QC Officer, i.e., a PAI employee not directly involved with the Fort Hood archeological project, was designated to serve as an independent observer. The QC Officer's primary task was to review the project periodically and determine the following: (1) that the scope of work and contract requirements were being followed; (2) that all field procedures were being followed and were appropriate, and that the data recovered were recorded properly; (3) that the field and laboratory/analysis procedures manuals were being used effectively; and (4) that archeological site investigations, data recording, and National Register evaluations were done in a consistent and appropriate manner.

To ensure that the QC Officer monitored work consistently during various phases of the project, a QC Inspection Form, patterned after a form used during previous investigations by Mariah (Trierweiler, ed. 1994:Appendix B), was developed. The QC Inspection Form asks specific questions relating to four different aspects of each delivery order: (1) the Scope of Work and contract requirements; (2) archeological fieldwork; (3) laboratory and analysis work; and (4) NRHP site evaluations. The QC Officer conducted periodic inspections of various aspects of the prehistoric site testing and evaluation project and reported directly to the Principal Investigator. When necessary, recommendations for changes to improve the efficiency of various aspects of the archeological investigation were made. All recommendations and suggestions were passed on to the Project Manager, Project Archeologists, and crew members.

# **PALUXY GEOMORPHIC INVESTIGATIONS: SITE STRATIGRAPHY, SEDIMENTS, AND FORMATION PROCESSES**

*Karl W. Kibler*

**5**

## **INTRODUCTION**

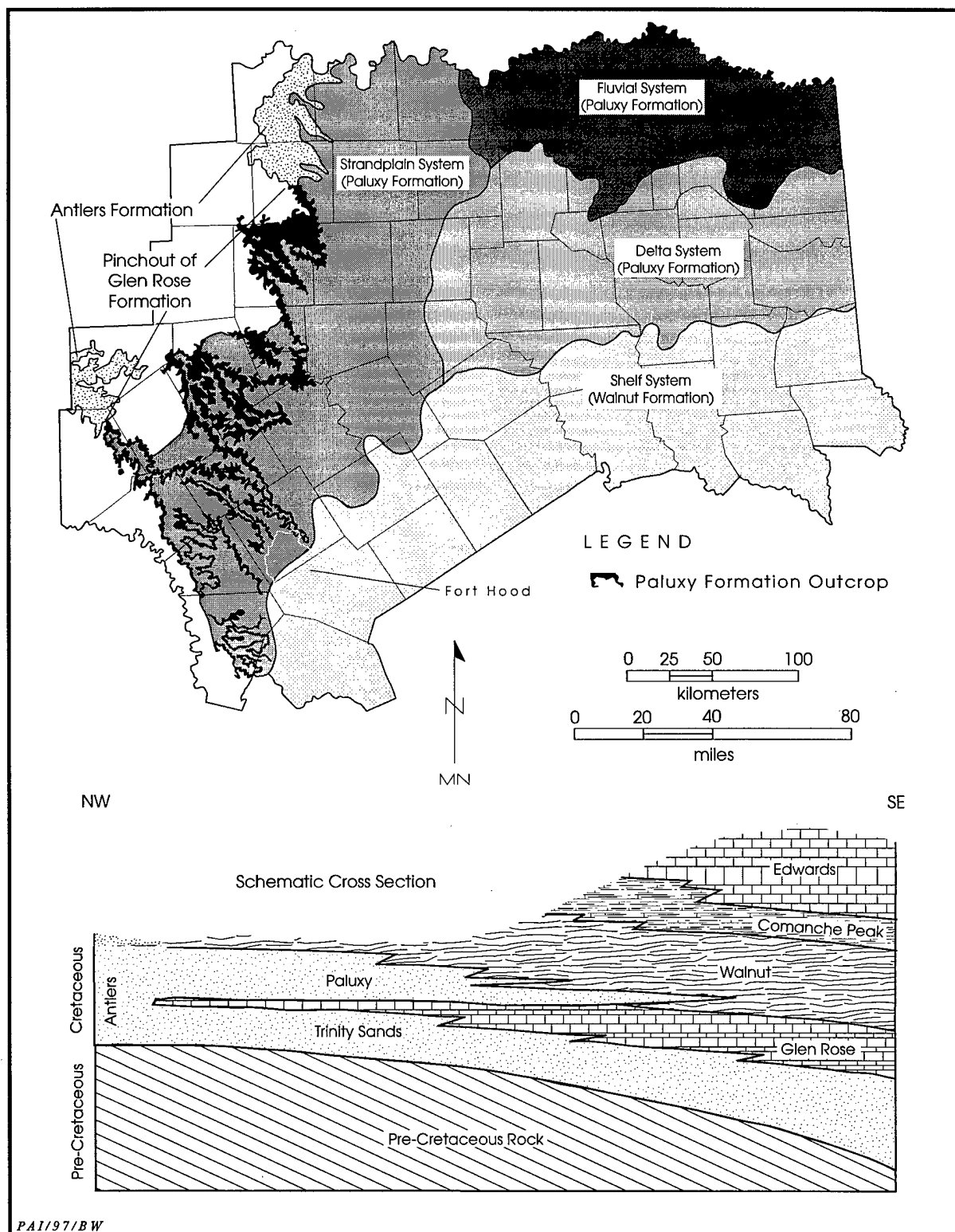
Archeological sites encapsulated in or resting on late Quaternary age sediments derived from the Paluxy Formation have been recognized as an important and unique set of cultural resources at Fort Hood. Previous investigators recognized that these sites occupy a specific topographic, geomorphic, and environmental niche within the dissected landscape of the Lampasas Cut Plain. They also recognized that the evidence of prehistoric cultural activities preserved in these sites is quantitatively and qualitatively different from the evidence preserved in sites in other settings (Abbott 1994c: 327–333; 1995c:814–823). While the ultimate goal of the archeological research is to find out what prehistoric peoples were doing while occupying Paluxy sites, it is first necessary to obtain a better understanding of the depositional environments of the sites and the sediments that comprise them. The geomorphological studies reported in this chapter are a continuation of the research directed toward understanding Paluxy site formation processes.

## **THE PALUXY FORMATION IN TEXAS**

Paluxy sites are so named for their predominantly sandy deposits which are derived from the Paluxy Formation. The Paluxy Formation is a terrigenous clastic formation of the Lower Cretaceous (Comanchean Series), Fredericksburg Group that developed along the northern and western margins of the East Texas embayment (Figure 7). The formation is comprised of thick subsurface deposits in the subsiding central basin that thin toward outcrops along the north-

ern and western basin margins and grade Gulfward into shelf marls and limestones. This is typical of Lower Cretaceous terrigenous clastic deposition in the East Texas embayment (Caughey 1977:4). The Paluxy Formation overlies the Glen Rose limestone of the Trinity Group. This contact is primarily unconformable, but may be gradational or interfingering in some areas (Atlee 1962:17; Owen 1979:5). North and west of the Fort Hood area, beyond the extent of the Glen Rose limestone, the Paluxy Formation merges with the lower Trinity sands; this forms an undifferentiated sand deposit known as the Antlers Formation (Atlee 1962:12; Owen 1979:8) that is the principal substrate underlying the Western Cross Timbers.

The Paluxy Formation is comprised of three major depositional systems: delta, fluvial, and strandplain (Caughey 1977). Deposits of the delta system are the thickest and most extensive, occupying the central basin area. The delta system grades updip to a fluvial system of channel fill and floodbasin facies and meanderbelt facies along the northern margin of the East Texas embayment. To the west, the delta system grades into an extensive strandplain system. The strandplain developed as a shifting complex of shoreline depositional environments on the western flank of the delta system (Caughey 1977:26). Its gradational contact with facies of the delta system indicates that its development was coeval with periods of delta progradation, and that deltaic sediments transported by longshore currents compose a portion of the strandplain deposits. These sediments, funneled through the fluvial and delta systems, were derived from the Arbuckle-Ouachita uplifts in Arkansas and Oklahoma (Atlee 1962:18). In addition, exposed basal Trinity sands were



**Figure 7.** Subaerial and subsurface extent of the Paluxy Formation and associated depositional systems (after Caughey 1977) and schematic cross section of the Paluxy Formation and bounding formations (after Atlee 1962).



reworked along strike and incorporated into the Paluxy strandplain. However, the majority of the strandplain sediments are believed to be locally derived from Pennsylvanian and older rocks of central Texas that were exposed along the landward margin of the strandplain and delivered by small streams (Atlee 1962:18; Owen 1979:13).

It is the strandplain deposits of the Paluxy Formation that are subaerially exposed in Texas, from Wise County south through the western part of Fort Hood (Coryell County) to eastern Burnet and southwestern Williamson Counties. Representative exposures along the Paluxy River in Erath County and upland outcrops near the town of Paluxy in Hood County were described and named by R. T. Hill in 1891 (Atlee 1962:8).

The Paluxy strandplain strikes northeast, approximately paralleling the strike of Comanchean strata, and dips southeast (Atlee 1962:12; Owen 1979:31). It measures 58 m thick in northern Erath and Hood Counties (Atlee 1962:Figure 3) and thins downdip to 6 m or less in eastern Burnet and southwestern Williamson Counties (Moore and Martin 1966:Figure 6). Overall, the sand deposits of the strandplain are relatively thin and uniform compared to those of the other two systems, for they were deposited on the stable platform of the buried Ouachita system (Caughey 1977:28).

The strandplain of the Paluxy Formation is overlain by the Walnut Formation. This contact is unconformable and erosional (Atlee 1962:17; Owen 1979); however, Gulfward facies of the Paluxy grade into or interfinger with the lower member of the Walnut Formation, the Bull Creek limestone (Moore and Martin 1966:982).

The strandplain deposits consist largely of sandstone, which occurs as isolated lentils and as laterally extensive sheets. Coarsening-upward sequences are discernible in some of the thicker sandstone units. Other rock units include argillaceous limestones and interbedded mudrocks consisting of laminated shales or massive mudstones, all of which become more common Gulfward. Carbonized plant remains and silicified wood are frequent and widespread in these deposits, and pelecypod casts and shell fragments occur locally (Caughey 1977:8, 22). These rock units represent coalescent beach ridge, shoreface, and coastal lake environments (Caughey 1977:1).

The sandstone units are comprised of medium to very fine quartz sand, slightly cemented (sparry calcite), commonly crossbedded (low-angle) and/

or laminated, with very minor amounts of feldspar, calcite, dolomite, pyrite, and clay minerals and virtually no heavy or dark minerals. Limonite concretions are locally abundant (Atlee 1962:10; Caughey 1977:24; Fisher and Rodda 1967:15–16; Owen 1979:5; Proctor et al. 1970). The sands are moderately to very well sorted and subangular to subrounded (Owen 1979:5), with smaller grain sizes and better sorting more prevalent basinward (Fisher and Rodda 1967:5).

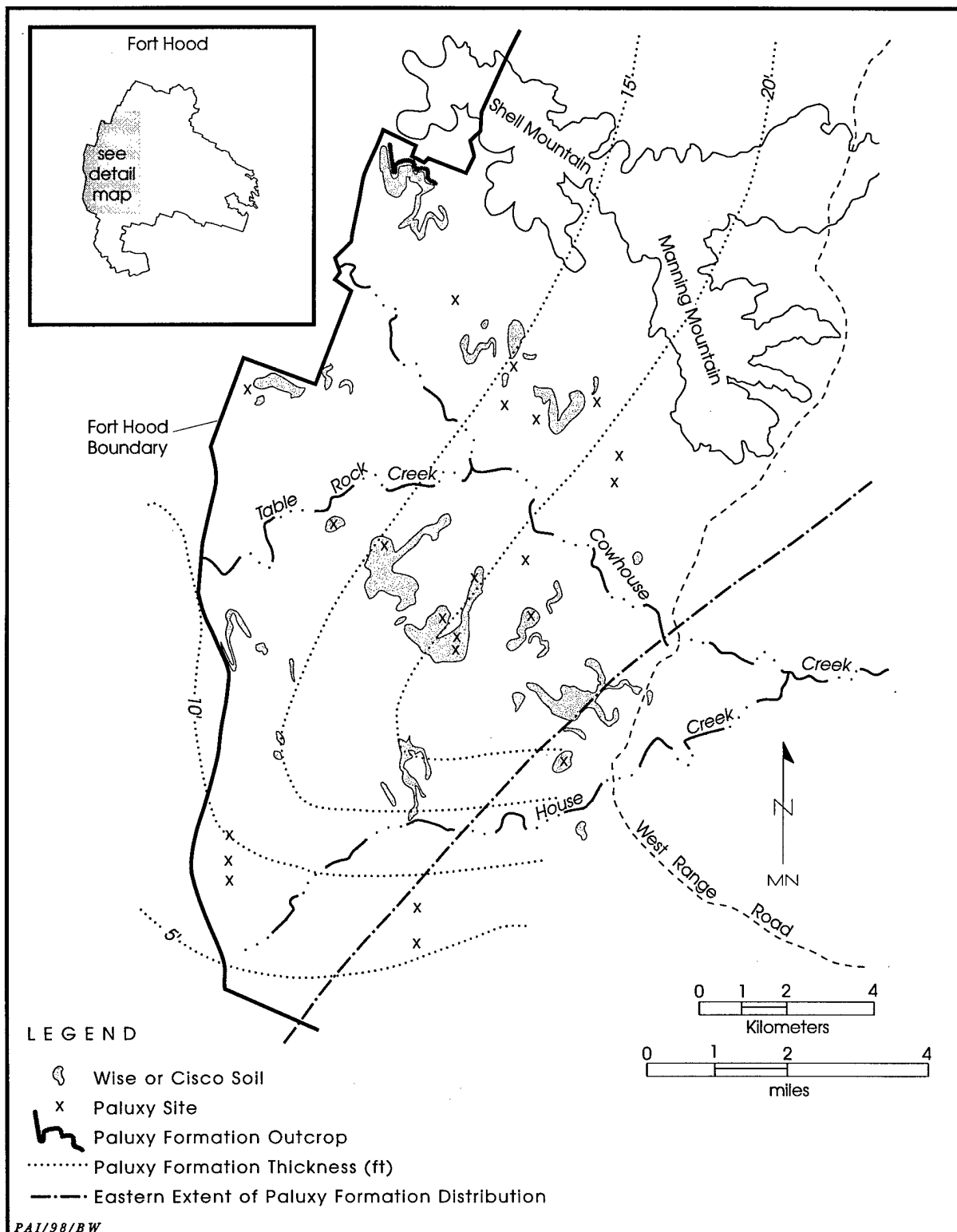
### THE PALUXY FORMATION AT FORT HOOD

On Fort Hood, the Paluxy Formation crops out below the Killeen surface along the upper margins of the Pleistocene-age valleys. Sandy sediments derived from the Paluxy have formed late Quaternary-age colluvial and sheetwash drapes up to 1–2 m thick along the upper valley margins. Pedogenesis has greatly altered the surficial Paluxy deposits and Paluxy-derived colluvial and sheetwash sediments forming varied soil catenas due to differing ages and local topography. These soils tend to be highly rubified, greatly contrasting with soils formed on the surrounding limestones and marls (Abbott 1995c: 816). Soils typically mapped on the Paluxy substrate include those of the Cisco and Wise series. Cisco soils are Alfisols that display a well-developed argillic horizon; they are typical of more-stable parts of the Paluxy, particularly the lower low gradient slopes. Wise soils are thicker, more weakly developed Inceptisols characteristic of more active erosional and depositional loci, including some broad, sandy drapes that mantle the upper slopes of Paluxy sites.

The Paluxy Formation outcrop is of relatively minor areal importance at Fort Hood (Figure 8<sup>1</sup>). The 1:250,000 Waco Sheet of the

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<sup>1</sup>Isoplethic data on the thickness and extent of the Paluxy Formation are from Moore and Martin (1966:Figure 6) and Caughey (1977:Figure 5). The extent of Paluxy Formation outcrops is based on distributions of Cisco and Wise soils (after McCaleb 1985), on field observations by Mariah Associates (Abbott and Trierweiler 1995a:Figure 9.10), Caughey (1977:Figure 1-6), and the *Geologic Atlas of Texas-Waco Sheet* (Proctor et al. 1970). Paluxy sites are those tested by Prewitt and Associates or Mariah Associates and recommended as eligible for listing in the National Register of Historic Places.



**Figure 8.** Distribution of Paluxy Formation outcrops and Paluxy sites on Fort Hood.

*Geologic Atlas of Texas* (Proctor et al. 1970) does not map the Paluxy Formation within the boundaries of Fort Hood, except for a total of ca. 500 acres along the northern upper valley margin of Cowhouse Creek as it enters the base, and both sides of the Henson Creek valley just before it enters the Leon River. The presence of a Paluxy outcrop along the upper valley margin of Cowhouse Creek is supported by other data, primarily soil maps (see McCaleb 1985); however, its presence along the lower Henson Creek valley is not independently supported by other data or recent archeological investigations that have taken place in the area. Four archeological sites (41CV1152 in this report and 41CV184, 41CV271, and 41CV849 in Trierweiler [1996]) have been tested in the lower Henson Creek area mapped as Paluxy by Proctor et al. (1970). None of these investigations confirmed the presence of a Paluxy Formation outcrop or sandy sediments derived from the Paluxy along the valley walls or associated uplands.

Soils of the Cisco and Wise series account for approximately 1,800 acres, or 0.8 percent, of Fort Hood (McCaleb 1985). Abbott (1994c:329) believes that the mapped distributions of Cisco and Wise soils provide "a reasonable indication" of the areal extent of Paluxy outcrops, although he also states the problems and probable inaccuracies inherent with using soil maps to define the extent of lithological units. Based on these data, it has been estimated that Paluxy outcrops probably do not exceed 2 to 3 percent of the total area of the base (Abbott 1995c:814). This, along with other observations, suggested to Abbott (1995c:814) that the Paluxy represents a thin, spotty mantle of sand on the Glen Rose with a maximum thickness of 3 to 4 m. He also observed that the Paluxy is entirely absent in some areas of Fort Hood and does not represent a continuous deposit and outcrop.

However, current knowledge of the true distribution and nature of Paluxy outcrops on Fort Hood may be skewed, due to varying degrees of visibility in and among different topographic settings. Paluxy sand exposures are obvious on gentle, low-gradient slopes where extensive redeposited and heavily weathered sands are recognized as prominent reddish soils. In contrast, colluvial sediments derived from the Paluxy do not accumulate in areas where the slope of the underlying Glen Rose limestone is too steep, which also limits the subaerial

exposure of the Paluxy Formation. Outcrops of Paluxy Formation in these areas may be very thin and possibly obscured by colluvium and other detritus derived from the overlying Walnut Formation.

The most reliable data regarding the nature, thickness, and extent of the Paluxy Formation and associated outcrops within Fort Hood are the measured sections and core data used by Moore and Martin (1966:Figure 6) to map the Paluxy Formation in western Coryell, eastern Lampasas, northeastern Burnet, and southwestern Williamson Counties. These data suggest that a continuous mantle of Paluxy sand up to 6–7.5 m thick is present across much of the western portion of Fort Hood (see Figure 8). Core data from counties north and northeast of Fort Hood, along with measured sections of local outcrops of Paluxy sand, were used by Caughey (1977: Figure 5) to extrapolate the thickness and extent of the Paluxy Formation across the Fort Hood area. Caughey's (1977) data and figures, although on a much larger scale than those of Moore and Martin (1966:Figure 6), reveal that the Paluxy Formation is thin but continuous across much of Coryell County. It is absent in Bell County. If this is the case, the Paluxy Formation is more than a patchy mantle overlying the Glen Rose limestone; instead, it probably represents more than 2 to 3 percent of the total area of the base, circumscribing every valley cut through the Walnut Formation or incised into the upper Glen Rose in the western and possibly northern portions of Fort Hood.

Even if the Paluxy Formation represents a more or less continuous mantle atop the Glen Rose across the western (and northern?) portions of Fort Hood, it is far from uniform. Its absence in Bell County suggests that the formation pinches out across the Fort Hood area. Abbott (1994c:328) observed several localities where the feathered edge of the formation interfingers with limestones. In terms of archeological potential, it is only a concern in areas where (1) the formation is relatively thick and extensively exposed, and (2) the gradient of the underlying Glen Rose limestone is nearly level, promoting the accumulation of eroded sands immediately downslope. It is these areas, evident as thin meandering bands of rubified sandy soils along the upper margins of some valleys, that contain significant evidence of prehistoric cultural activities.

## **PREVIOUS GEOARCHEOLOGICAL WORK ON PALUXY SITES**

Geoarcheological investigations have been conducted in association with archeological test excavations at five Paluxy sites at Fort Hood (see Abbott and Trierweiler 1995a). The results of these investigations clearly show that the weathered deposits of Paluxy-derived sands have been dynamic throughout the late Quaternary and that colluvial deposition was and continues to be an important process in the formation of these mantles and a significant means of site burial (Abbott and Trierweiler 1995a:480). Throughout the late Quaternary, Paluxy-derived deposits were subject to cycles of gully formation and erosion, deposition, and soil formation. Soil development on the Paluxy Formation sands and on late Quaternary sandy colluvial and slopewash sediments varies considerably due to age and local topography.

Abbott and Trierweiler (1995a:475) identified three cycles or units of erosion, deposition, and pedogenesis at site 41CV595. The most recent cycle, Unit 3, dates to the late Holocene and characteristically consists of a thin mantle of very dark grayish brown loamy sand to sandy loam sediments. Unit 3 is generally <20 cm thick, although sand deposits up to 180 cm thick may fill gullies cut into the underlying unit. This sandy mantle is typically imprinted with an A horizon or, in thicker deposits, an A-E soil profile. Weak Bk horizons, similar in color to the overlying A horizon, may form in deposits thicker than 60 cm. It is within Unit 3 that buried cultural materials and features occur at Paluxy sites. The contact between Unit 3 and Unit 2 is generally abrupt.

Unit 2 is late Pleistocene to early Holocene in age and typically 80–160 cm thick. Rounded fragments of sandstone bedrock may be present at the base of Unit 2, indicating erosion of the bedrock during the initial stages of deposition. Cultural materials may be present in the top 20 cm, probably due to bioturbation. Unit 2 is imprinted with a well-developed, yellowish red sandy clay Bt horizon that grades to a reddish yellow to yellow sand and to a loamy sand BC horizon. This soil is almost always truncated; however, intact profiles including the A horizon have been observed buried on lower sections of the slope (Abbott 1994c:329). Unit 2 may rest on Unit 1 or unweathered Paluxy Formation sedi-

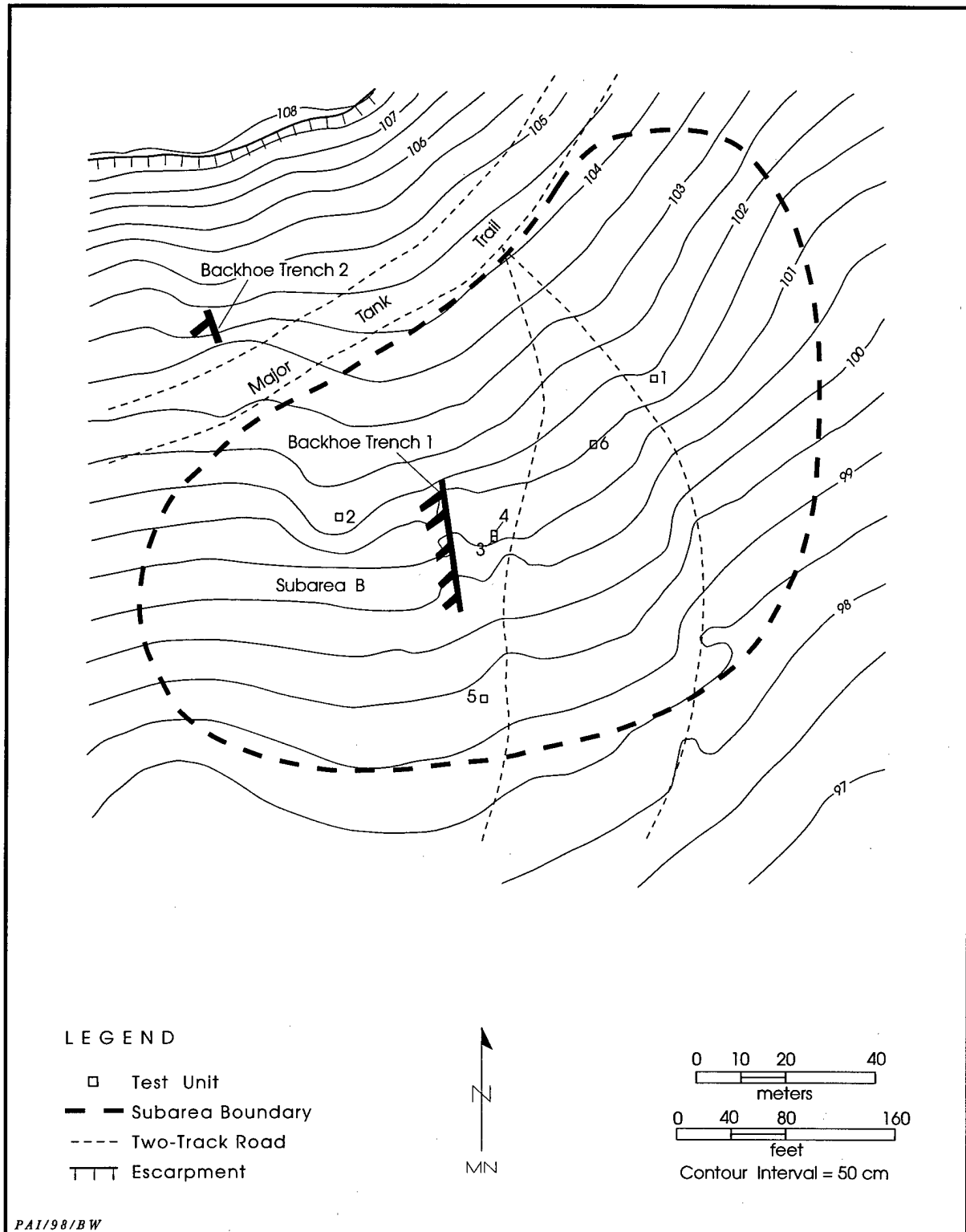
ments. In either case, the contact is abrupt and wavy.

Unit 1 is Pleistocene in age and typically 30–170 cm thick. Its top is truncated and its contact with the underlying bedrock may be gradational or abrupt. Unit 1 is imprinted with a reddish yellow to yellowish red loamy sand and sand Bk-BC soil profile. Underlying these late Quaternary colluvial units is bedrock, the Paluxy sandstone. It consists of a white to brownish yellow fine-grained sand and may be slightly lithified.

Abbott and Trierweiler's (1995a) interpretation of the chronostratigraphy and pedology for Paluxy site 41CV595 provides a credible model for evaluating the archeological potential of the weathering Paluxy mantle. However, further investigations directed at dating the colluvial units are needed, as well as more data on the natural processes (e.g., mode of deposition, bioturbation) involved in site formation. Such investigations may provide a data set complementary to existing and ongoing geomorphological and paleoenvironmental studies of Fort Hood's stream valleys (e.g., Nordt 1992).

## **CURRENT GEOMORPHOLOGICAL INVESTIGATIONS AT PALUXY SITES**

Geomorphological investigations were carried out at 14 Paluxy sites in 1996. In addition to the examination and documentation of stratigraphic profiles at all of these sites, more-detailed investigations were conducted at site 41CV1258. At site 41CV1258, profile drawings and descriptions (see Appendix B) from two backhoe trenches and five of the six archeological test units (Figure 9) were completed, and 16 sediment samples were collected and analyzed (see Appendix C). The studies and analyses conducted at site 41CV1258 centered on Backhoe Trench 1, a 30-m-long trench paralleling the profile of the slope, and Backhoe Trench 2, which sampled the Walnut and Paluxy Formations at the interface of the Killeen surface and the upper margins of the House Creek valley ca. 20 m upslope from site 41CV1258. A 26-m-long stratigraphic profile drawing of the east wall of Backhoe Trench 1 was completed, and five 1-m-wide sections of this profile were described. Thirteen sediment samples were collected from Backhoe Trench 1, and three were collected from Backhoe Trench 2.



**Figure 9.** Plan view of portion of site 41CV1258 showing backhoe trench and test unit locations.

The sediment samples and profile drawings and descriptions provide information on the stratigraphy, chronology, depositional processes, and soils of the depositional units and associated sediments at 41CV1258.

The chronological data obtained from 41CV1258 and other Paluxy sites are both absolute and relative. Absolute dating methods involved the radiocarbon dating of soil humates and charcoal. A relative chronology for the deposits at 41CV1258 and other Paluxy sites is based on stratigraphy and assessments of the degree of soil development. These assessments involved field observations, profile descriptions, and petrographic analysis of selected sediment samples.

Depositional and natural site formation processes were delineated through field observations, profile drawings, particle-size analysis of sediment samples, and petrographic and clay mineral analysis of selected sediment samples. These observations, assessments, and analyses provide data on and a clearer understanding of the depositional processes at Paluxy sites.

## **RESULTS OF GEOMORPHOLOGICAL INVESTIGATIONS AT 41CV1258**

### **Stratigraphy and Geochronology**

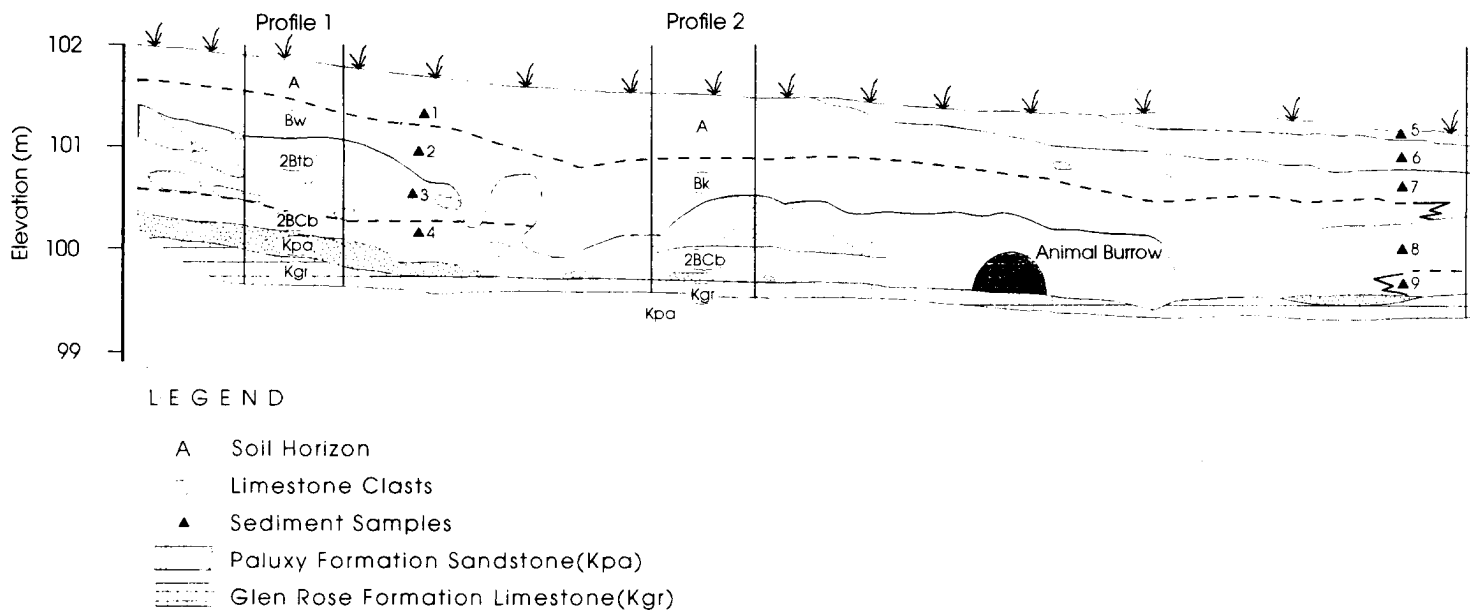
The stratigraphic profiles of Backhoe Trench 1 at site 41CV1258 reveal a wedge-shaped unit comprised of sandy loam to sandy clay loam deposits which are pedogenically altered to varying degrees (Figure 10). The wedge overlies the Glen Rose limestone and has a maximum thickness of at least 180 cm which tapers downslope to a thin feathered edge. The maximum thickness of these deposits at other Paluxy sites may range from as little as 50 cm to as much as 200 cm or more.

Five 1-m-wide segments or profiles along the east wall of Backhoe Trench 1 were described to characterize the sediments and stratigraphy of the shoulder, backslope, footslope, and toeslope (these terms follow those of Ruhe and Walker [1968]) of site 41CV1258 (see Appendix B). Profile 1 is located along the northern end of Backhoe Trench 1 and the shoulder of site 41CV1258. Profile 1 consists of 175 cm of sandy loam to sandy clay loam sediments overlying a thin bed of Paluxy Formation quartzitic sand-

stone and Glen Rose limestone. Four zones are recognized in the unconsolidated deposits of Profile 1. Zones 1 (0–35 cm) and 2 (35–80 cm) consist of dark yellowish brown and yellowish brown sandy loams, respectively. These zones comprise a weak blocky structured A-Bw soil. The Bw horizon has a clear smooth lower boundary. Zones 3 (80–150 cm) and 4 (150–175 cm) represent a truncated strong brown to reddish yellow soil (2Btb-2BCb profile) imprinted on sandy loam to sandy clay loam sediments. Limestone clasts are common throughout Zones 1–3, but tend to decrease in size upward.

Profile 2 consists of 180 cm of unconsolidated sediments overlying a thin, discontinuous bed of Paluxy Formation quartzitic sandstone and Glen Rose limestone. Three zones are recognized in the sediments. Zone 1 is a 65-cm-thick dark grayish brown fine sandy loam A horizon. It grades to a 67-cm-thick yellowish brown sandy loam Bk horizon (Zone 2). Limestone clasts are common throughout both zones and are ultimately the carbonate source for the  $\text{CaCO}_3$  filaments in the Bk horizon. The Bk horizon has an abrupt to clear smooth lower boundary. Zone 3 (132–180 cm) is a reddish yellow fine sandy loam and represents a truncated 2BCb soil. Limestone clasts are common throughout the soil profile; in fact, highly weathered cobble- to boulder-sized limestone clasts are common throughout the lower truncated soil on the shoulder of 41CV1258.

Profile 3 consists of 142 cm of unconsolidated sediments overlying the Glen Rose limestone. Five zones are recognized in these sediments. Zone 1 is a 12-cm-thick dark grayish brown sandy loam A horizon. Zone 2 (12–40 cm) is a strong brown sandy loam to sandy clay loam C horizon. A few granule-sized limestone clasts were observed throughout Zones 1 and 2. Zone 3 is a 35-cm-thick moderate blocky structured buried soil (2Ab horizon) comprised of a brown to dark brown sandy clay loam. This buried soil also was observed in the profile of Test Units 3 and 4, ca. 9 m east of Backhoe Trench 1. A bulk soil sample was collected from the base of the soil (Test Unit 3 at 71–81 cm) for dating by radiocarbon assay. The soil humates yielded a conventional radiocarbon age of  $2210 \pm 60$  B.P. (Beta-102107). Zone 4 (75–122 cm) is a brown to dark brown sandy clay loam imprinted with a truncated 3Btb soil horizon. The soil has a weak prismatic structure that parts to a moderate blocky structure. The many  $\text{CaCO}_3$  filaments in Zone 4



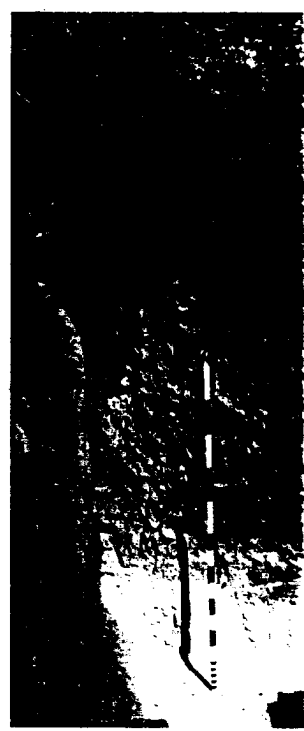
Profile 1



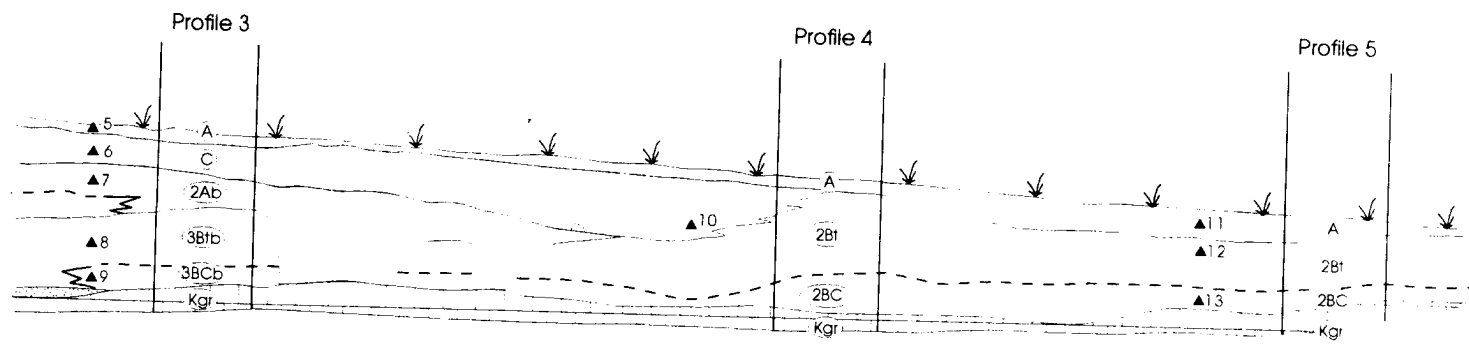
Profile 2



Profile 3



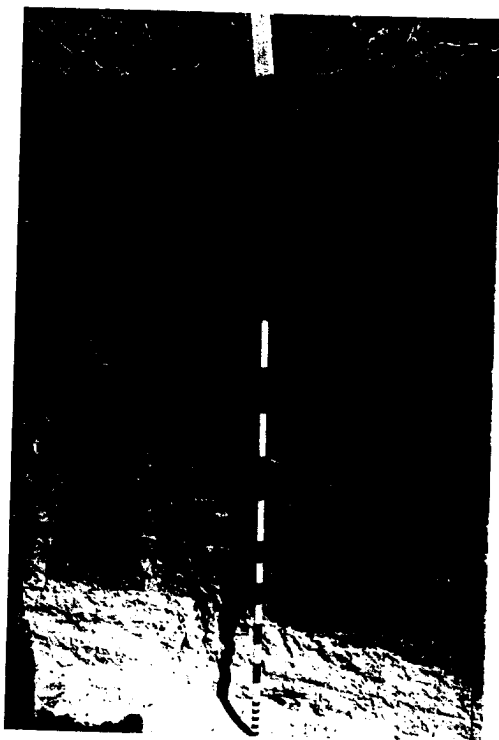
**Figure 10.** Profile drawing and photographs of the east wall of Backhoe Trench 1, 41CV1258.



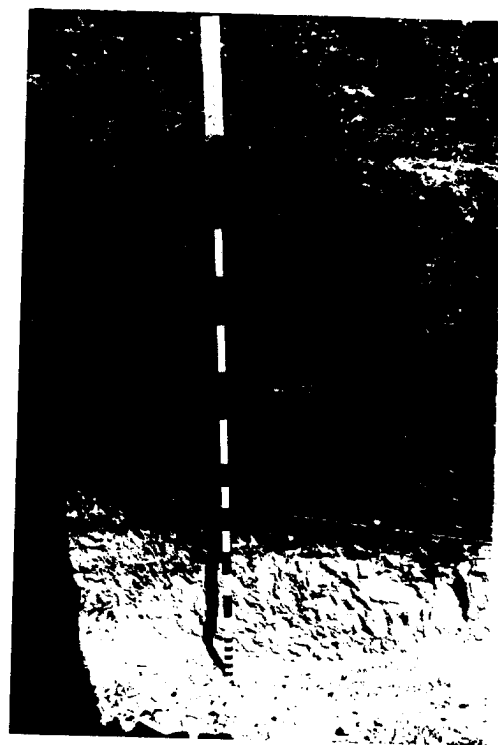
Profile 3



Profile 4



Profile 5





are probably a postburial phenomenon due to the weathering of granule-sized and smaller limestone clasts in the overlying deposits (Zones 1–3). Zone 5 (122–142 cm) is a strong brown sandy loam that represents the lower portion of the truncated solum. Zone 5 is a moderate blocky structured 3BCb horizon overlying the Glen Rose limestone.

Profile 4 consists of 128 cm of unconsolidated sediments in which three zones were recognized. Zone 1 is a 13-cm-thick very dark grayish brown sandy loam with an abrupt smooth lower boundary. The sediments are imprinted with a weak granular-structured A horizon. Zone 2 (13–92 cm) is a yellowish red sandy clay loam exhibiting a strong blocky-structured truncated 2Btb soil. The lower part of this truncated solum is represented by Zone 3, a 36-cm-thick moderate blocky-structured 2BCb horizon. Zone 3 rests on the Glen Rose limestone.

Profile 5 consists of 98 cm of unconsolidated sediments in which three zones were recognized. Zone 1 (0–25 cm) is a very dark grayish brown sandy loam exhibiting a weak granular-structured A horizon. Zone 2 (25–75 cm) is a yellowish red sandy clay loam and represents a truncated 2Btb soil. Manganese stains are common on the ped faces of this strong blocky-structured soil. Zone 3 (75–98 cm) is a yellowish red sandy clay loam representing the lower portion of the truncated solum. It is designated a 2BCb horizon and rests on the Glen Rose limestone.

The stratigraphic and pedogenic characteristics of these profiles provide insight into the number and ages of depositional units at site 41CV1258 and other Paluxy sites. The youngest unit, Stratum I, is equivalent to Abbott and Trierweiler's (1995a:475) Unit 3. This unit is represented by Zones 1 and 2 of Profiles 1 and 2, Zones 1–3 of Profile 3, and Zone 1 of Profiles 4 and 5. Stratum I is characterized by sandy loam textures. It obtains a maximum thickness of 132 cm in Profile 2 and tapers downslope to where it pinches out and the Glen Rose limestone is surficially exposed. Test Units 2 and 6, which occupy similar shoulder and backslope localities, also exhibit thick Stratum I deposits (80+ and 122+ cm, respectively).

Stratum I soils typically consist of thin, dark (10YR 3/2, 4/2, and 4/4) A horizons on the footslopes and toeslopes; the soils are typically thicker upslope and where Stratum I sediments fill deep gullies. It is these thicker deposits that

exhibit weak Bk and Bw horizons. At half of the Paluxy sites investigated, Stratum I is less than 50 cm thick and no B horizons were observed. Occasionally, E horizons rather than B horizons were observed in the thicker portions of Stratum I (e.g., 41CV988 and 41CV1106). Stratum I may also contain buried soils, such as at sites 41CV947, 41CV984, 41CV988, 41CV1106, and 41CV1258. These buried A horizons typically occur on the lower slopes of the site, are similar in texture and color to the modern A horizon, and are shallowly buried, suggesting recent burial. The exception to this was observed at sites 41CV947, 41CV1106, and 41CV1258, where the buried soils were observed upslope of the footslope. Of particular interest are the sediments overlying the buried soils at 41CV947 and 41CV1258. The strong brown (7.5YR 4/6) sandy clay loams burying the soils are similar in texture and color to the ancient Bt horizons found throughout most Paluxy sites; however, cultural materials encapsulated in these sandy clay loams, their weak soil structure, and the underlying buried soils suggest otherwise. They may represent eroded and reworked materials from remnant ancient upslope Bt horizons. The soils expressed in Stratum I vary due to the overall thickness and the local depositional and erosional history of the unit. Recent and older buried soils within Stratum I suggest a dynamic depositional and pedogenic history.

Stratum I is archeologically significant because it contains all of the buried artifacts and cultural features found on Paluxy sites. Cultural evidence, along with a number of radiocarbon dates from cultural features and soil humates indicate a late Holocene age for Stratum I (Table 7). Fourteen radiocarbon dates from cultural features at 9 of the 14 investigated Paluxy sites range from 2865 to 325 B.P. (all of the dates presented in this section represent the 1-sigma calibrated ranges of the conventional radiocarbon ages), with the majority of dates falling between 2175 and 905 B.P. (average = 1540 B.P.,  $\sigma$  = 635 years). The radiocarbon date from the buried soil at 41CV1258 (2330–2135 B.P.) falls within the range of the majority of Paluxy site dates.

A suite of 19 radiocarbon ages obtained by Abbott and Trierweiler (1995a) and Trierweiler (ed. 1994, 1996) on snail shells (*Rabdotus* sp.) and charcoal during earlier investigations of Paluxy sites include only seven dates that fall

**Table 7. Paluxy site radiocarbon dates**

Site	Sample	Material	1-Sigma Calibrated Age Range
Site investigations by Prewitt and Associates, Inc.			
41CV947	Beta-102090	charcoal	1860–1740 B.P.
41CV947	Beta-102091	charcoal	1305–1265 B.P.
41CV984	Beta-102092	charcoal	1095–950 B.P.
41CV984	Beta-102093	charcoal	2865–2780 B.P.
41CV988	Beta-102094	charcoal	1265–1165 B.P.
41CV988	Beta-102095	charcoal	1180–1075 B.P.
41CV1049	Beta-102096	charcoal	1530–1400 B.P.
41CV1049	Beta-102097	charcoal	1570–1360 B.P.
41CV1093	Beta-102098	charcoal	1330–1290 B.P.
41CV1106	Beta-102099	charcoal	500–325 B.P.
41CV1138	Beta-102100	charcoal	2710–2365 B.P.
41CV1143	Beta-102101	charcoal	1165–1065 B.P.
41CV1143	Beta-102102	charcoal	2315–2140 B.P.
41CV1258	Beta-102106	charcoal	1830–1715 B.P.
41CV1258	Beta-102107	soil humates	2330–2135 B.P.
Previous site investigations by Mariah Associates, Inc.*			
41CV319	Beta-71166	charcoal	940–797 B.P.
41CV478	Beta-88352	snail shell	5445–5295 B.P.
41CV478	Beta-88353	snail shell	5911–5741 B.P.
41CV478	Beta-88354	snail shell	5982–5773 B.P.
41CV594	Beta-64229	charcoal	1506–1321 B.P.**
41CV594	Beta-64230	charcoal	291–0 B.P.**
41CV594	Beta-64231	charcoal	4982–4846 B.P.**
41CV594	Beta-64232	charcoal	4815–4450 B.P.**
41CV595	Beta-70033	charcoal/soil	1875–1701 B.P.
41CV595	Beta-70034	charcoal/soil	1266–1064 B.P.
41CV595	Beta-70035	charcoal	928–728 B.P.
41CV1027	Beta-64233	charcoal	4840–4571 B.P.**
41CV1027	Beta-64234	charcoal	5035–4855 B.P.**
41CV1027	Beta-64235	charcoal	5289–4989 B.P.**
41CV1027	Beta-64236	charcoal	5035–4840 B.P.**
41CV1391	TX-8188	charcoal	958–926 B.P.
41CV1391	Beta-75165	charcoal	1810–1538 B.P.
41CV1403	Beta-88356	snail shell	4408–4233 B.P.**
41CV1403	Beta-88357	snail shell	3568–3462 B.P.**

\* Dates from Abbott and Trierweiler (1995a); Trierweiler (ed. 1994, 1996). Calibrations were calculated with CALIB 3.0 (Stuiver and Reimer 1993) using the data sets of Stuiver and Pearson (1993) and Pearson and Stuiver (1993).

\*\* Samples obtained from non-Stratum I contexts.

between 2175 and 905 B.P. (see Table 7). The majority ( $n = 11$ , 57.9 percent) of the dates are much older, spanning the later part of the middle Holocene and the early part of the late Holocene, while one (Beta-64230) is much younger, or post-dates 2175–905 B.P. Eight of the 11 older radiocarbon dates (72.7 percent), as well as the one recent date (Beta-64230), are from contexts

unlike Stratum I. These dates were obtained from surficial burned rock features resting on exposures of Paluxy Formation sandstone at the shoulders and summits of hillslopes and not from Paluxy-derived sediments like those of Stratum I. Thus, these dates cannot contribute to the dating or age estimate of Stratum I. The other three older dates (27.2 percent) were obtained from

shoulder and backslope proveniences of Paluxy-derived sediments much like those of Stratum I. These three dates range from 5982 to 5295 B.P. The inclusion of these three dates with six of the seven dates that fall within the range of the majority of current Paluxy site dates (one of the seven dates [Beta-64229] is excluded because it is not from a Stratum I context) and the dates from the current Paluxy site investigations reveal that the majority of these dates range from 3525 to 485 B.P. (average = 2005 B.P.,  $\sigma = 1,520$  years; Figure 11). This range of dates is believed to be an accurate age estimate for Stratum I at most Paluxy sites, although clearly there are Stratum I deposits preserved in some shoulder and backslope localities of some Paluxy sites that predate 3500 B.P. and deposits on the footslopes and toeslopes of some sites that postdate 500 B.P.

The lower boundary of Stratum I varies from abrupt to clear in shoulder and backslope localities to very abrupt to abrupt in footslope and toeslope environments. The contact is generally wavy, indicating that Stratum II was subject to severe erosion and gulying prior to the deposition of Stratum I. Stratum II is recognized in Zones 3–4 of Profile 1, Zone 3 of Profile 2, Zones 4–5 of Profile 3, and Zones 2–3 of Profiles 4 and 5. It is equivalent to Abbott and Trierweiler's (1995a:475) Unit 2. The thickness of Stratum II varies throughout Backhoe Trench 1 (from 115 cm in Profile 4 to 48 cm in Profile 2) due to its truncated and eroded nature. It is probable that, prior to truncation, the maximum thickness of Stratum II occurred on the shoulder or backslope with the unit and gradually pinched out at the toeslope. Highly weathered cobble- and boulder-sized limestone clasts are common throughout the shoulder and backslope portions of Stratum II, but are absent from the footslope and toeslope. Sandy clay loam and sandy loam textures characterize Stratum II. These textures, particularly the sandy clay loams, are believed to be a product of soil development (illuviation) more than a product of deposition. Stratum II soils consist of truncated Bt or Bt-BC horizons, which tend to grade from highly weathered, rubified, strongly developed soils on the footslopes and toeslopes to less weathered, moderately developed soils on the shoulders and backslopes. This gradation is represented by changes in color, soil structure, degree of manganese staining, and degree of bioturbation between the soils of the upper and lower slopes. These soils are part of a

larger catena that formed on Stratum II. Soil catenas generally exhibit varying soil profiles primarily due to the differing topographic positions of soils on a slope (Birkeland 1984:238–240; Buol et al. 1980:129), but it is believed that age differences also can account for the variation observed in the soils of Stratum II (this is discussed in more detail below).

The Bt horizons observed on the footslopes and toeslopes generally are more red in color (red, 2.5YR 4/6; yellowish red, 5YR 4/6 to 5/6 to 5/8; reddish brown, 5YR 4/4 to 5/4; and dark reddish brown, 5YR 3/4 and 2.5YR 3/4), while upslope the Bt horizons are generally more brown (brown, 7.5YR 4/4 to 5/4; strong brown, 7.5YR 5/6; and yellowish brown, 10YR 5/4 to 5/6) in color. This trend was particularly apparent at sites 41CV1043, 41CV1049, 41CV1143, and 41CV1258. Soil structure tends to grade from strong, medium to coarse, blocky peds in the soils of the lower slopes to moderate blocky peds or weak, coarse, prismatic peds breaking to moderate blocky peds upslope. The Bt horizons on the lower slopes display evidence of greater bioturbation, as pedotubules and root casts are more common. Manganese stains are also more common on the peds of soils on the footslopes and toeslopes.

On the toeslopes of some Paluxy sites, the sandy clay loam Bt horizon is relatively thin and rests on the Glen Rose limestone. However, in thicker deposits of Stratum II, the Bt horizons grade to strong brown to yellowish red BC horizons. Texturally, the BC horizons range from sandy loams to sandy clay loams. There is a tendency for the BC horizons on the footslopes and toeslopes, if present, to be redder in color and have a slightly higher clay content. At site 41CV1258 the BC horizon rests on the Glen Rose limestone or Paluxy sandstone.

The age of Stratum II is not known, although it is fairly clear that it was truncated by ca. 4000–5000 B.P. Abbott and Trierweiler (1995a:475) suggested that Unit 2 (or Stratum II in this report) accumulated during the late Pleistocene–early Holocene. Certainly the preserved deposits of Stratum II, which are in the form of a well-developed Bt or Bt-BC soil, date to the late Pleistocene since no in situ cultural materials and features have ever been recovered from them. However, it is not clear whether the former top of Stratum II dated to the early Holocene or contained archeological materials. Abbott (1995c:816)

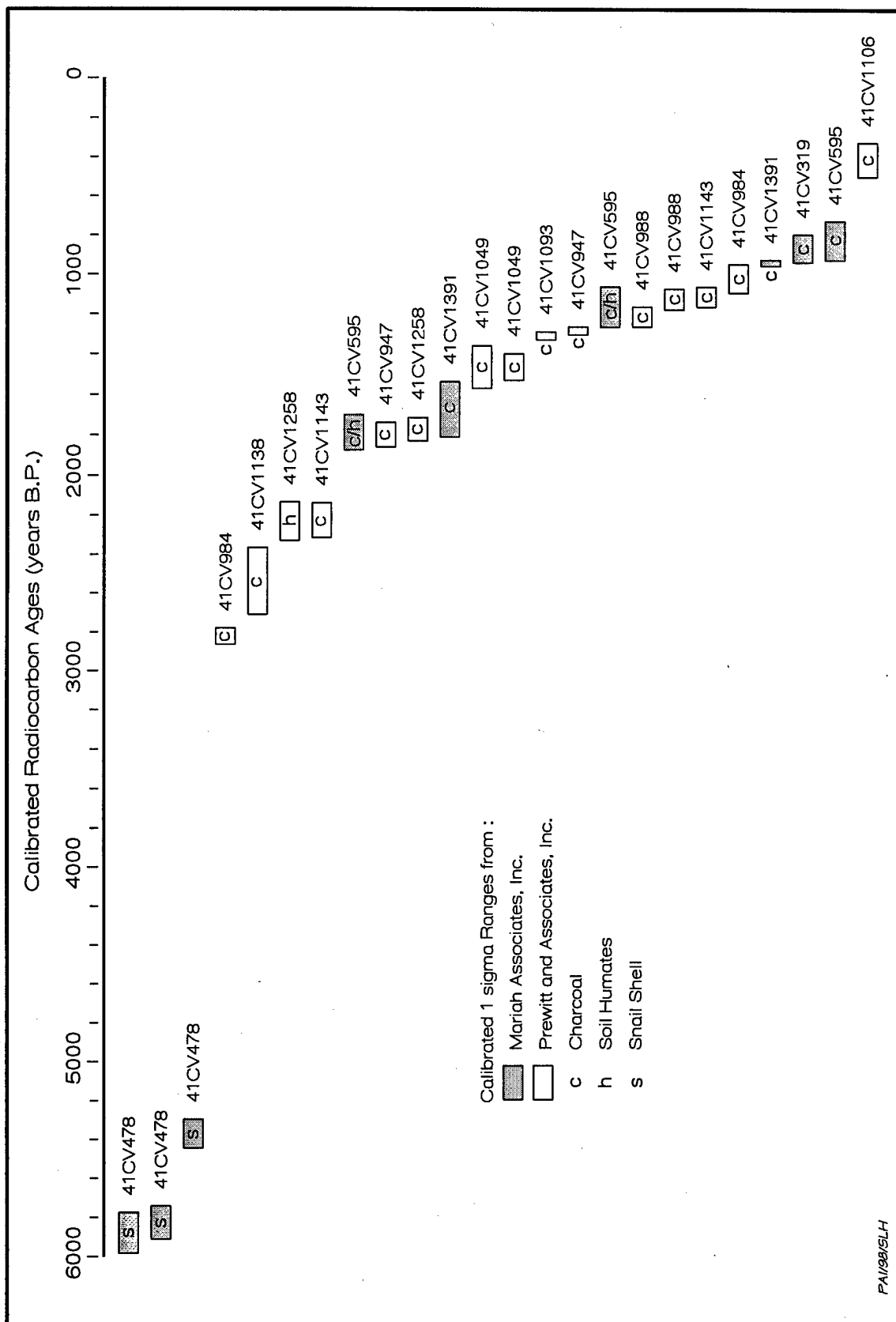


Figure 11. Graph of calibrated radiocarbon dates from Stratum I contexts at Paluxy sites..

observed a rarely preserved portion of the original top of Stratum II at site 41CV1391 in the form of a dark brown loamy sand A horizon, but it contained no artifacts. This evidence and the general belief that it may take thousands (if not tens of thousands) of years for Bt or argillic horizons to develop (Birkeland 1984:208; Waters 1992:54) suggest that Stratum II is at least late Pleistocene in age. However, it has been noted by Holliday (1983:57) that Bt horizons may form relatively quickly as a result of the mechanical infiltration of detrital clays in sandy deposits. This possibility may address two issues regarding the age of Stratum II and its subsequent pedogenic alteration. First, it is possible that Stratum II accumulated during the late Pleistocene-early Holocene as proposed by Abbott and Trierweiler (1995a), and therefore cultural materials would be absent in the lower deposits of Stratum II, but may have been encapsulated in the upper (now missing) deposits. If aggradation ceased during the early Holocene, the rapid translocation of detrital clays inherent in the sandy parent material could have formed well-developed Bt horizons within a few millennia or less, rather than several millennia. Secondly, the Bt horizons observed on the shoulders and backslopes, which tend to be not as well developed or rubified as those on the footslopes and toeslopes, are probably not as old as their counterpart parts on the lower slopes. These soils have probably formed since ca. 4000-5000 B.P., after earlier Bt horizons on shoulder and backslope localities were severely truncated and degraded. Under this scenario, it is possible that Stratum II was aggrading as late as the early Holocene. The onset of severe erosion, probably during the middle Holocene or Altithermal, truncated Stratum II after the rapid formation of the Bt soil during the early Holocene. The striping of well-developed, rubified soils on the steeper shoulders and backslopes at this time coincides well with the deposition of the reddish yellow sediments of the Fort Hood alluvium in the stream valleys of Fort Hood (see Nordt 1992:64). The cessation of Fort Hood alluvial sedimentation also coincides well with the commencement of Stratum I aggradation.

Other units of nonarcheological significance were recognized during the Paluxy site studies; however, these units are poorly preserved, typically underlie Stratum II, and were not observed at many of the Paluxy sites investigated (includ-

ing 41CV1258). An equivalent to Abbott and Trierweiler's (1995a) Unit 1 was not observed at 41CV1258 or any other Paluxy site investigated, with the possible exceptions of 41CV1050 and 41CV1138. At both sites, an abrupt smooth to wavy boundary separates a well-developed Bt or Bt-BC horizon from underlying sandy clay loam to clay loam BC horizons. Boundary characteristics and textural and color differences suggest that the BC horizons represent discrete depositional units. This unit is probably late Pleistocene in age. A fourth unit is recognized at sites 41CV1049 and 41CV1050 in the form of a K horizon. At 41CV1049, the K horizon is comprised of laminae of pale yellow to brownish yellow caliche and yellowish red clay; at 41CV1050, it consists of a white soft caliche. These caliches represent the remnants of a much older late Pleistocene soil.

The Lower Cretaceous Paluxy Formation sandstone was encountered in Backhoe Trench 2 at 41CV1258 and at sites 41CV988, 41CV1049, 41CV1106, 41CV1138, and 41CV1143. It was typically encountered on the shoulders of the hillslopes below a thin Walnut Formation deposit or Holocene mantle of reworked Paluxy sand. This suggests that what is generally referred to as a Paluxy site consists primarily of a wedge of sediments derived from the Paluxy Formation and deposited on the Glen Rose limestone, though there are exceptions to this notion. Abbott (personal communication 1998) has argued that at most Paluxy sites, the upper slopes are underlain by intact but highly weathered Paluxy Formation rather than colluvial deposits of reworked Paluxy sand. A more detailed examination of the sediments at site 41CV1258 is presented below in order to resolve or bring some clarity to this issue of site formation processes.

#### **Site Formation Processes and Provenience of the Sediment**

Depositional processes were investigated to determine the kinds of depositional environments and site formation processes and the overall archeological potential of Strata I and II at 41CV1258 and other Paluxy sites. It was assumed based on observations of profiles at 41CV1258 and other Paluxy sites, and data from previous studies, that the sediments comprising most Paluxy sites represent late Quaternary

colluvial/sheetwash deposits and in situ weathered Paluxy Formation deposits. Identifying intact Paluxy Formation deposits would be an important initial step for distinguishing culturally relevant deposits at Paluxy sites. However, differentiating between the two deposits is not always a simple matter at many Paluxy sites. Sedimentary structures and stratigraphic boundaries are not well preserved and are often masked by pedogenesis. In order to obtain a better understanding of the depositional environments at 41CV1258, known deposits of intact Paluxy Formation were examined, sampled, and compared with other profiles and samples collected from deposits (Strata I and II) of unknown and known environments. These Paluxy Formation profile descriptions and samples (Samples 14 and 15) were collected from Backhoe Trench 2 at 41CV1258. Several lines of evidence suggest that the profile of Backhoe Trench 2 represents a foreshore beach environment. Sedimentary structures include planar-laminated to intermediate- to low-angle topset beds, analogous to modern quartz sand beaches of the Gulf Coast (McKee 1964:284) and foreshore beach deposits in general (Galloway and Hobday 1983:123). Hydrometer and sieve analyses reveal that the samples are predominantly sand (95–97 percent) with mean grain sizes of 2.93 (Sample 14) and 2.99 (Sample 15) phi (see Appendix C). The sand fraction of both samples is very well sorted ( $\sigma = 0.33$  and 0.28, respectively), which is also characteristic of the foreshore beach environment.

If intact Paluxy Formation foreshore beach deposits are present in the profile of Backhoe Trench 1 at 41CV1258, they are not recognizable due to a strong degree of soil development.

The only unquestionable Paluxy Formation deposit observed in Backhoe Trench 1 is a thin (<25 cm), broken lens of friable quartzitic sandstone in the upslope portion of the profile at the contact with the Glen Rose limestone (see Figure 8). A comparison of particle size data (sand fraction) from Backhoe Trenches 1 and 2 reveals that the mean phi sizes of Backhoe Trench 1 samples (2.74 to 2.92 phi, average = 2.85 phi) are slightly larger than those of the Backhoe Trench 2 samples (2.93 to 2.99 phi, average = 2.96 phi). The presence of a somewhat coarser-grained sand population suggests that the Paluxy Formation is not the only sediment source for Strata I and II.

Limestone clasts were observed throughout

the profiles of Backhoe Trench 1 and probably make up the majority of particles larger than 2 phi (medium sand) since particles this size and larger do not occur in the local Paluxy Formation. Petrographic analysis of Samples 7 and 11 displays constituents that are not present in the deposits of the Paluxy Formation, such as carbonate rock fragments, mica, and clay clasts (cf. Sample 14, see Appendix C). In addition, the hydrometer analysis shows a greater amount of silt- and clay-sized particles in Samples 1–13 than in Samples 14 and 15. The silts and clays in these samples are believed to be detrital in origin and not the result of in situ weathering. The petrographic analysis of Sample 14 reveals that the Paluxy Formation deposit predominantly consists of quartz (ca. 93 percent), a very stable mineral which could not account for the relatively large amounts of clay (14–33 percent, average = 21 percent) in Samples 1–13. Clay minerals within Strata I and II (Samples 6 and 12) were compared to those of the Paluxy Formation (Sample 14) and those of the overlying Walnut Formation (Sample 16) upslope from site 41CV1258. No clay minerals were found in Sample 14. Samples 6, 12, and 16 contain mixtures of illite and kaolinite. Calcite was also present in Sample 16, which probably formed from the weathered beds of carbonate rocks and calcareous muds of the Walnut Formation. Its absence from Samples 6 and 12 of Backhoe Trench 1 suggests that this easily weathered mineral is quickly leached from the Paluxy site deposits, or at least from the upper portion of the soil mantle. While it is fairly clear that the deposits encapsulating and underlying 41CV1258, and probably most other Paluxy sites, are a mix of Paluxy and Walnut Formation sediments, it is still uncertain as to whether sediments at some Paluxy sites represent redeposited and reworked Paluxy and Walnut Formation sediments or a highly weathered, but largely intact Paluxy Formation sand. Obviously, the mechanisms and processes that brought this mix of sediments and clasts together will differ depending on how one views the nature of Paluxy sites. Natural processes of site formation for both scenarios are presented below, though more credence is given to the view that Paluxy sites are largely accumulations of Paluxy and Walnut Formation-derived sediments based on the more-detailed observations and work conducted at 41CV1258.

If Paluxy site formation processes are largely viewed as the accumulation of Paluxy and Walnut Formation-derived sediment, then it can be assumed that colluvial processes are the dominant depositional process. Moss and Walker (1978) argue that the transport of colluvial sediments involves fluvial processes similar to those observed in more-energetic fluvial environments, such as stream channels. The exception to this is that colluvial transport occurs in extremely shallow flows or surface flow. Surface flow may occur in one of two ways—sheetwash or rillwash (Young 1972:62). Sheetwash is the rapid run-off of water and sediments in a shallow unconfined or unrestricted flow. This process is intensified by the presence of exposed bedrock, impermeable subsurface layers of sediment, or a fully saturated soil mantle, which prevents the rapid infiltration of run-off. Rillwash is confined to braided and/or anastomosing microchannels that constantly shift.

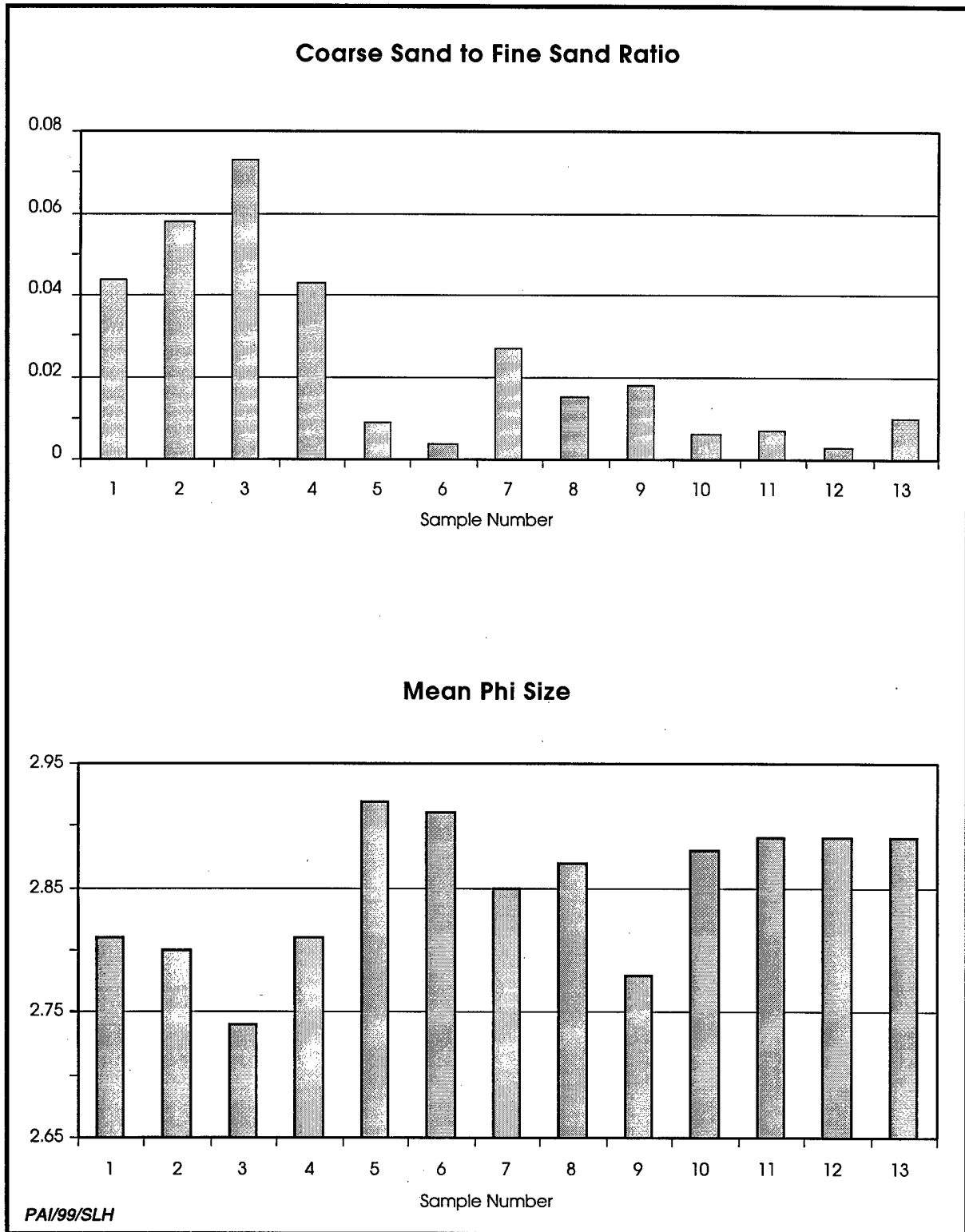
As the surface of a Paluxy site aggrades, it is quite possible that a point is reached where the significance of sedimentation through surface flow dramatically decreases. Since surface flow can occur only with sufficient energy in areas where impermeable layers of sediment or bedrock are close to the surface, an overthickening of the sandy Paluxy site deposits may consequently hamper surface flow through high infiltration rates. Ultimately, surface flow would occur with less frequency and with less competence to transport sediment. Surface flow would be limited to the footslopes and toeslopes where Stratum I is relatively thin and is underlain by the relatively impermeable Bt horizons of Stratum II, and where Stratum II is underlain by the Glen Rose limestone. Surface flow may also occur on shoulder localities; competence and velocity may remain high as water leaves the relatively impervious surface of the Walnut Formation. However, the rate of flow would decrease, causing sediment to be deposited as it moved onto the sandy mantle of the upper slopes. The decrease in the importance of surface flow sedimentation as Paluxy site deposits aggrade probably accounts in part for the abundant limestone gravels observed in Stratum II, the rounded sandstone gravels at the base of Stratum I at some sites, and the general tendencies for some of the profiles at 41CV1258 to fine upward (Table 8; Figure 12) and fine toward the distal end of the mantle.

**Table 8. Coarse sand/fine sand ratios and mean phi size of sand fraction for Samples 1–13**

Sample	Coarse Sand/ Fine Sand Ratio	Mean Phi Size
1	.044	2.81
2	.058	2.80
3	.073	2.74
4	.043	2.81
5	.009	2.92
6	.004	2.91
7	.027	2.85
8	.015	2.87
9	.018	2.78
10	.006	2.88
11	.007	2.89
12	.003	2.89
13	.010	2.89

Alternatively, if the deposits on the upper slopes are intact but highly weathered Paluxy Formation sands, an argument could be made that the incorporation of limestone clasts (from the underlying Glen Rose limestone) is the result of small fossorial animals (Abbott, personal communication 1998). Although it is difficult to imagine the larger (cobble to boulder size) limestone clasts within the sandy deposits at 41CV1258 being introduced and mixed through bioturbation, this mechanism might explain the general tendency of the clasts to decrease in size upward. Rodent burrowing will disperse smaller clasts (those with a maximum dimension less than burrow size) upwards throughout the soil mantle as larger clasts gradually subside to the approximate depth limits of burrowing (c.f. Johnson 1989).

Continued sediment transport and sedimentation on thick Paluxy sites may be the product of other mechanisms. It is possible that raindrop impact is an important agent of transport at Paluxy sites, particularly on steeper portions of the slope. Raindrop impact, which is normally a powerful agent of soil detachment, may become a major transport agent, particularly on sandy sediments mantling slopes (Young 1972:66–68). Sediment transport through raindrop impact would not be affected by the thickness of the sandy mantle. Other depositional processes may include mass wasting (such as that described by Reneau et al. [1989]), particularly as the more friable Paluxy Formation is undercut and transported downslope and the overlying Walnut



**Figure 12.** Graphs comparing coarse sand to fine sand ratios and mean phi sizes for Samples 1–13.



Formation beds of limestone and marl calve-off and retreat. Mass wasting of the Walnut Formation may have played a significant role in the aggradation of Stratum II in the late Pleistocene. Numerous cobble- and boulder-sized limestone clasts were observed throughout Stratum II in Profiles 1 and 2 of Backhoe Trench 1 at 41CV1258. In addition, the presence of sandstone gravels at the base of Stratum I may also indicate that mass wasting of the Paluxy Formation occurred during the initial aggradation of Stratum I, although it is conceivable that the sandstone gravels are simply unweathered portions of an intact Paluxy Formation substrate and not detrital clasts, as they are too friable to endure transport of any distance (Abbott, personal communication 1998). This implies that in some cases, Stratum II represents a highly weathered but intact Paluxy Formation sand.

Although it is probable that some mass wasting occurred, particularly in the formation of Stratum II, many of the smaller clasts deposited through this process were probably subjected to reworking and transport by surface flow and raindrop impact. These agents transported and sorted the sediments downslope. Textural analyses show a decrease in the mean phi sizes of the sand fraction, and a transition from moderately well sorted to well-sorted sands (see Appendix C), as the gradient decreases at the footslopes and toeslopes. This may also explain why the well-developed Bt horizons of Stratum II, as noted by Abbott (1994a:34), are predominantly preserved on footslope and toeslope localities where the erosive energies of surface flow wane due to infiltration upslope and an overall decrease in the gradient of the slope at these localities.

Although it cannot be clearly determined whether Paluxy sites sediments are comprised primarily of Paluxy bedrock or represent colluvium derived from the Paluxy and Walnut Formations, it can be stated that the processes of site burial appear to be dominated by surface flow in the form of sheetwash and/or rillwash and raindrop impact. Mass wasting was also probably an important depositional process in the early formation of many Paluxy sites, particularly Stratum II. Initial deposition of Strata I and II may have been rapid, as mass wasting occurred upslope and surface flow was able to occur frequently and with sufficient strength to transport sediment over impermeable layers of

bedrock (for Stratum II) and truncated Bt soil horizons (for Stratum I). As the sandy Paluxy site deposits accumulated and became thicker, sedimentation through surface flow may have decreased significantly, although sediment transport through raindrop impact probably continued at the same pace. The presence of buried soils in Stratum I at sites 41CV947, 41CV984, 41CV988, 41CV1106, and 41CV1258 suggests that episodes of rapid sedimentation occurred during the late Holocene. Episodes of rapid sedimentation and soil burial are believed to be random local phenomena due to localized denudation upslope evident at some sites, not the result of climatic changes or other regionwide catalysts.

The erosion and stripping of Paluxy sites may ultimately be the result of the overthickening of the sandy deposits. At a certain point, the accumulation of thick sandy deposits will retard the energies of surface flow and sedimentation will slow dramatically. The result of this is either pedogenesis or erosion, but given the relatively loose and unconsolidated nature and gradient of the sandy Paluxy site surface, erosion will likely predominate. This is a simple explanation for the stripping of the sandy surface, but the truncated and severe gulying that cuts through Stratum II (to bedrock in some cases) may be the result of a complex of other factors and mechanisms.

The truncation of Stratum II prior to 4000–5000 B.P. may have been initiated by the degradation of vegetation due to the onset of xeric climatic conditions. Nordt et al. (1994) see an expansion of  $C_4$  plant communities in the alluvial valleys of Fort Hood between 6000 and 5000 B.P. They interpret this expansion and domination of  $C_4$  plants as the result of Altithermal climatic conditions. With this in mind, it is interesting to note that the  $\delta^{13}C$  value ( $-19.7\text{‰}$ ) obtained from the buried A horizon at 41CV1258 suggests that Paluxy site mantles were dotted with trees, rather than grasslands like most upland localities. It is estimated that 73 percent of the biomass at site 41CV1258 was  $C_3$  plants during the late Holocene, which is not an unusual estimation given the tendency for Alfisols, such as the Cisco soil, to support woodland or forest vegetation (Ropp and Hill 1998:36; Buol et al. 1980:28). Although this estimate is for the vegetative cover during the late Holocene, there is little reason to doubt that the same floral

patterns were not present on the sandy well-drained soils of Stratum II prior to the Altithermal. Based on this, it is believed that tree fall, brought on by the more arid conditions of the Altithermal, may have initiated the development and growth of gullies. A similar process is evident today on Fort Hood when heavy tracked vehicles move across the surface of Paluxy sites. The vehicles leave deeply incised tracks from which gullies will develop and grow. Regardless of the causal factors, the formation and growth of gullies on Paluxy sites are detrimental to the preservation of archeological components. What sheetwash, rillwash, and raindrop impact have gently buried and sealed over the centuries, gullying may dissect and destroy over a short period of time. The fact that gullies tend not to migrate laterally may dissect many archeological sites and components into a discontinuous network of "patches and islands."

Ultimately, the formation of a Paluxy site environment is conditioned by two factors: the thickness of the Paluxy Formation outcrop, which when undercut promotes the retreat of the Paluxy and Walnut Formations and formation of colluvial deposits, and a low gradient of the more-resistant Glen Rose limestone downslope, which promotes the accumulation of the colluvial sediments. These factors coexist throughout the west-central portion of Fort Hood, primarily north of House Creek, south of Shell and Manning Mountains, and west of West Range Road to the western boundary of Fort Hood (see Figure 8). It is in this area that the

Paluxy Formation is more than 3 m thick and the resistant Glen Rose limestone is exposed along the upper margins of Pleistocene-age valleys in the form of low-gradient slopes. Paluxy sites are documented south of this area; however, the thinner beds of the Paluxy Formation were not conducive to the formation of thick, predominantly sandy colluvial units with well-developed argillic soil imprints (see sites 41CV1191, 41CV1194, and 41CV1283). North of this area the Paluxy Formation is greater than 3 m thick, but it is not exposed to the same extent in this area as it is south of Shell and Manning Mountains.

Paluxy sites on Fort Hood formed in areas where relatively thick Paluxy Formation outcrops (>3 m) were present above low-gradient Glen Rose limestone slopes. Many of the examined Paluxy sites appear to be nothing more than an accumulation of redeposited Paluxy sands and Walnut Formation sediments, though at some sites—particularly on the upper slopes—it is conceivable that the sandy deposits are in fact a highly weathered but intact Paluxy Formation sand. Regardless, the presence of large pockets of well-drained sandy soils within vast areas dominated by limestone bedrock were utilized by prehistoric peoples and provided an excellent setting for camping and other activities. The real attraction, however, may have been the fact that these sandy Paluxy-derived sediments were specialized niches providing a unique floral community and offering an abundance of subsistence resources not found in other settings (see Chapter 12).

# RESULTS OF TESTING AT PALUXY SITES

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This chapter describes the results of the 1996 archeological testing at 14 sites situated in Paluxy sediments in the western portion of Fort Hood (see Figure 2 and Table 3). Fourteen backhoe trenches and 66 test units (422 levels) were excavated at these sites, and 17 analysis unites were defined (Table 9). Discussions in Chapter 5 provide the background information necessary for understanding the geology and geomorphology of sites situated in Paluxy sediments.

## 41CV947

### Site Setting

Site 41CV947 is situated on a gentle west-facing slope located south and west of unnamed tributaries of Cowhouse Creek. Some well-traveled tank trails bisect the site, but the majority of the area is covered with vegetation. Trees consist of an oak-elm-juniper-mesquite woodland with a moderate understory growth. Site elevation is 265 m above mean sea level.

### Previous Work

Masson and Drollinger (Texas A&M University) recorded the site on 24 April 1985. Its principal feature was a burned rock midden (40x10 m) which paralleled the terrace edge. A profile of the midden was observed in "deep vehicle tracks," but was not depicted on the site map. Burned rock concentrations and scatters,

bifaces, and debitage were noted. Two untyped dart points were surface collected. An estimated 50 percent of the site was disturbed by erosion and vehicular traffic.

On 3 November 1992, Turpin and Frederick (Mariah Associates) revisited the site. The site was situated on a gentle midslope bench across an outcrop of the weathered Paluxy sand. The more-resistant Walnut and Glen Rose Formations comprised the steeper slope segments above (east of) and below (west of) the site, respectively. A wide variety of soil profiles (A-C, A-Bw-C, and A-Bw-2Ab) was noted in a roadcut where the slope was steep. This suggested that the sandy sediments in this portion of the site were relatively mobile. Several burned rock features or part of a burned rock midden were shallowly

**Table 9. Summary of analysis units defined at Paluxy sites**

Site	Subarea Tested	Analysis Unit	Analysis Unit Setting
41CV947	—	1	slope
41CV984	—	1	slope
41CV988	B	1	slope
41CV1043	A	1	slope
41CV1049	A	1	slope
41CV1050	A	1	slope
41CV1093	—	1	slope
41CV1106	—	1	slope
41CV1138	—	1	slope
41CV1143	A	1	slope
41CV1191	—	1	slope/terrace (non-Paluxy)
		2	slope/terrace (non-Paluxy)
		3	slope
41CV1194	—	1	slope
		2	terrace (non-Paluxy)
41CV1258	B	1	slope
41CV1283	B	1	slope

buried within the A and Bw soil horizons along the road cut. In addition, lithic tools, debitage, and mussel shells were noted. Based on the areal extent of cultural materials, the site dimensions were enlarged to 200x150 m. To the south, more-stable soils were present, and an A-Bw-Bt-C profile was noted in a roadcut off-site. Although vehicular traffic and erosion impacted the site, much of the area appeared undisturbed. Since the site had the potential for intact deposits, shovel testing was recommended.

On 8 December 1992, a crew excavated 20 shovel tests. Twelve (60 percent) shovel tests produced lithic artifacts and burned rocks from the surface to a maximum depth of 50 cm, but the greatest density of cultural materials occurred at 10–20 cm. One shovel test yielded an untyped arrow point from 0–10 cm. Based on these results, the site had the potential to contain intact cultural deposits of unknown significance. The recommended testing effort consisted of 6–10 m<sup>2</sup> of manually excavated test pits to determine National Register eligibility (Trierweiler, ed. 1994:A1107–A1109).

### **Work Performed**

Since 41CV947 was thought to be located within a protected endangered species habitat, the site location was field checked by Gil Eckrich (Texas Nature Conservancy) and Gemma Mehalchick (Prewitt and Associates) on 2 May 1996. Permission to proceed with mechanical and manual excavations was granted once the site was determined to be outside the limits of protected areas.

On 17 June 1996, Prewitt and Associates completed formal testing of 41CV947 (Figure 13). One backhoe trench and three 1x1-m test units (Test Units 1–3) were dug; 3.1 m<sup>3</sup> was manually excavated.

Excavated in the central portion of the site, 5 m south of and parallel to a road cut, Backhoe Trench 1 was oriented to 75° and measured 22.0x0.8x1.5 m. Isolated burned rocks and burned rock lenses, along with sparse lithic artifacts, were exposed in various sections of the trench walls at approximately 45, 60, and 90 cm. Charcoal was collected from among burned rocks at 42–46 cm along the south wall near the west (downslope) end of the trench. Situated near the west end of Backhoe Trench 1, Test Unit 1 was placed along the north wall above a lens of

burned rocks exposed at 40–45 cm, directly opposite the location of the charcoal sample near the west end of the trench. The test unit was excavated to weathered sandstone at 110 cm. Approximately 7 m east (upslope) of Test Unit 1, Test Unit 2 was placed adjacent to the south wall of Backhoe Trench 1 and above lithic artifacts and burned rocks visible at ca. 70 cm in the trench wall. The excavation was terminated on weathered sandstone at 140 cm. North of Backhoe Trench 1, Test Unit 3 was excavated along the north edge of a road cut where burned rocks were exposed at approximately 20 cm. Decomposing sandstone was encountered at 60 cm.

### **Site Extent and Depth**

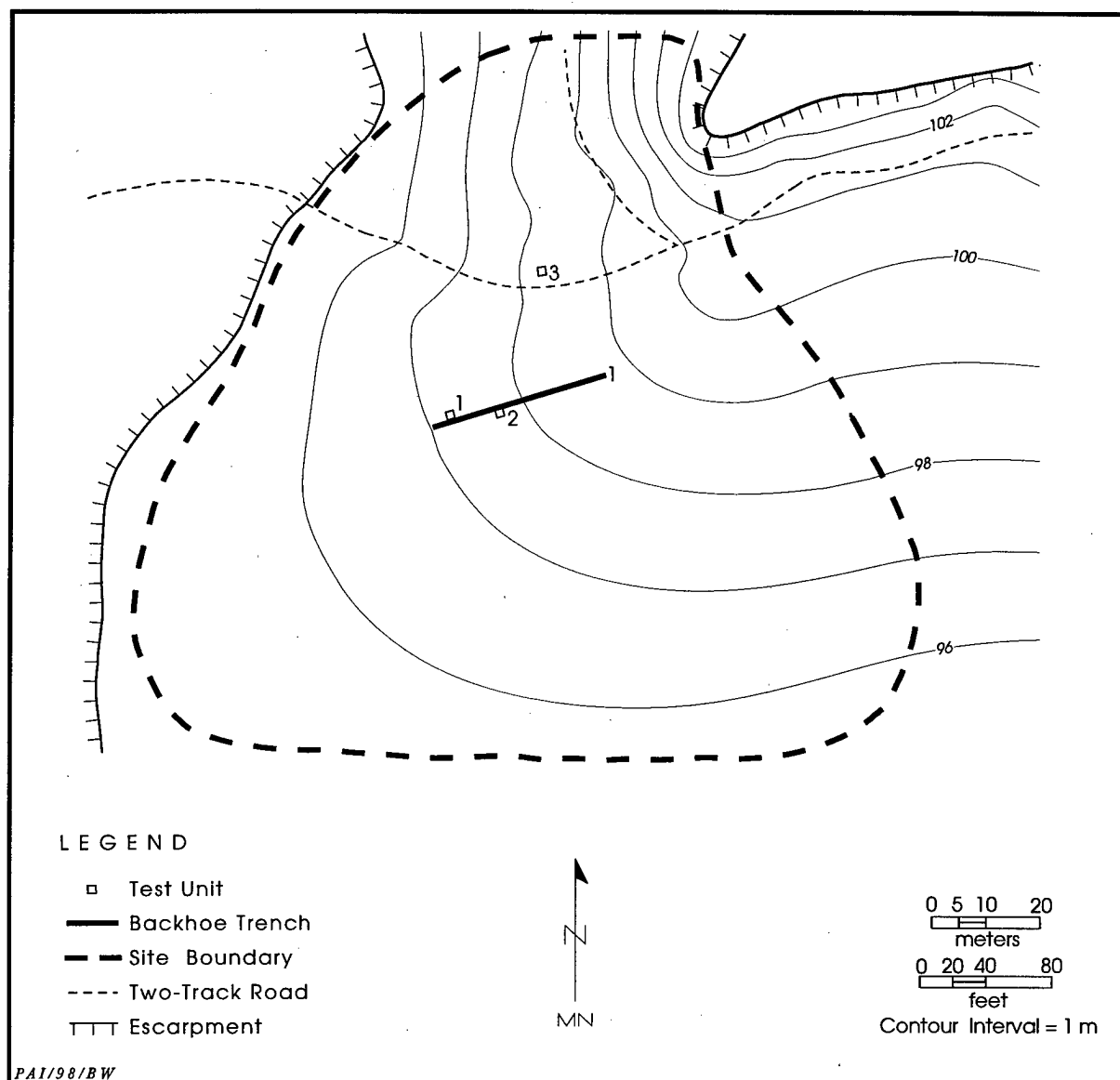
The slope is bounded on the east and west by the Walnut clay and Glen Rose limestone, respectively. Although the Paluxy sand continues an unknown distance north and south, the testing results and surficial extent of cultural materials indicate that the site measures 150 m east-west by 135 m north-south. Based on the presence of discrete features and artifacts in test units, intact cultural deposits occur between 10 and 90 cm.

### **Sediments and Stratigraphy**

The stratigraphy of Backhoe Trench 1 revealed a sandy Holocene colluvium imprinted with two soils that vary in thickness and degree of development upslope and downslope from the described 149-cm-thick trench profile (Figure 14 and Appendix B). The modern soil has formed on a late Holocene-age colluvium and consists of a very dark grayish brown loamy fine sand A horizon (0–30 cm) and strong brown sandy clay loam C horizon (30–134 cm). This late Holocene unit overlies an earlier Holocene colluvial unit (134–149+ cm). The brown to dark brown sandy loam sediments contain many rounded sandstone fragments, suggesting that erosion of the sandstone bedrock occurred upslope during the deposition of this unit. The lower depositional unit is imprinted with a 2Ab horizon.

### **Cultural Materials**

Cultural material were recovered in all three test units at 41CV947 (Table 10). From 0–90 cm, Test Unit 1 yielded a total of 21 burned rocks



**Figure 13.** Site map, 41CV947.

(4.75 kg), 28 flakes, and 1 edge-modified flake. Approximately 82 percent of these items were found from 20–40 cm. No artifacts were recovered from 90–110 cm.

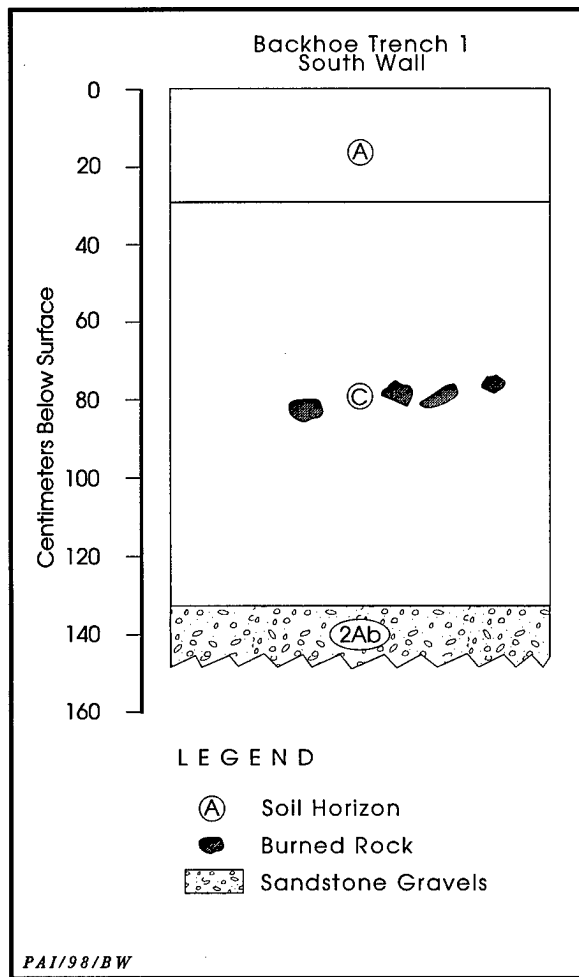
In Test Unit 2, the six levels above Feature 3 (0–60 cm) produced 53 burned rocks (5.75 kg), 80 flakes, 1 cobble tool, 1 spokeshave, 1 side scraper, 1 miscellaneous uniface, and 1 untypeable dart point fragment. A total of 36 burned rocks (8.25 kg), 14 flakes, and 2 edge-modified flakes were found in the matrix surrounding and below Feature 3, from 80–130 cm. Only Level 14 (130–

140 cm) was culturally sterile.

No cultural materials were found in Test Unit 3 from 0–10 and 40–60 cm. Feature 1 was encountered from 10–32 cm. At 20–40 cm, the test unit produced six burned rocks (0.5 kg) and three unmodified mussel shells, two of which are burned. These materials are probably associated with Feature 1.

### Cultural Features

Encountered at 10–32 cm in Test Unit 3,



**Figure 14.** Profile of south wall of Backhoe Trench 1, 41CV947.

Feature 1 (an occupation zone) consisted of an amorphous accumulation of burned limestone ( $n = 224$ , 69.5 kg). Extending across the entire unit, the burned rocks were 2–3 layers thick and horizontally laid. The overwhelming majority (ca. 90 percent) were fist-sized and smaller angular pieces. The remainder were slabs (up to 35x15x5 cm), and many were cracked in situ. No internal patterning was apparent, and numerous roots were present throughout the feature. The feature matrix produced two flakes. Although not submitted for macrobotanical analysis, two processed flotation samples contained sparse amounts of charred wood and microdebitage. Charcoal collected at 15–20 cm yielded a radiocarbon age of  $1370 \pm 50$  B.P. (Beta-102091, see Appendix A). Burned rocks associ-

ated with the feature were visible in all three walls of the test unit. Along the road cut, the exposure of burned rocks extends an additional 2 m to the east and 1 m to the west beyond the test unit. Based on the excavation results and road cut exposures, Feature 1 measures at least 4 m east-west and 1.5 m north-south.

Feature 2 (a hearth) was encountered in Test Unit 1 from 36–58 cm. It consisted of a single layer of 35 burned rocks (55 kg) exhibiting very little imbrication and no evidence of disturbance (Figure 15). Approximately 80 percent of the feature was constructed of slabs ranging in size from 13x12x3 cm to 30x25x5 cm, with many cracked in situ. The remaining rocks were medium-sized tabular and angular pieces. Extending across the entire unit, the outermost burned rocks along the north, south, and east edges sloped to the south and west toward the deepest portion of the feature. This appears to represent the center of the hearth, and a subtle basin shape was apparent after excavation. The feature matrix contained two flakes, scattered pieces of charcoal, and burned sand. A flotation sample collected at 45–58 cm contained charred macro-botanical remains of *Quercus* wood and indeterminate thin and thick nutshell fragments (see Appendix E). The *Quercus* wood yielded a radiocarbon age of  $1880 \pm 40$  B.P. (Beta-102090, see Appendixes A and E). The feature extends into all three walls (west, north, and east) of the test unit and an additional 30 cm east and 40 cm west along the north wall of Backhoe Trench 1. However, no burned rocks are present in the opposite (south) trench wall. Consequently, the hearth is estimated to measure ca. 170 cm in diameter.

In Test Unit 2, Feature 3 (an occupation zone) was encountered across the entire unit from 60–80 cm, but was restricted to the south-west quadrant from 80–90 cm. It consisted of a dense, amorphous concentration of burned rocks ( $n = 190$ , 67.5 kg) two layers thick. Approximately 80 percent were limestone; the remainder were sandstone. Two-thirds of the burned rocks ranged in size from 5 to 15 cm and were angular and subrounded pieces. The remainder were tabular fragments averaging 15x12x3 cm. Overall, the feature sloped gently from north to south, with no internal patterning or disturbances apparent. The feature fill yielded 14 pieces ofdebitage. Two processed flotation samples contained low frequencies of

Table 10. Summary of cultural materials from 41CV947, Test Units 1-3

Provenience	Dart Point	Side Scraper	Miscellaneous Uniface	Spokeshave	Cobble Tool	Edge- modified Flakes	Unmodified Debitage	Unmodified Shells	Totals
TEST UNIT 1									
Level 1 (0-10 cm)	-	-	-	-	-	-	-	-	0
Level 2 (10-20 cm)	-	-	-	-	-	-	1	-	1
Level 3 (20-30 cm)	-	-	-	-	-	-	19	-	19
Level 4 (30-40 cm)	-	-	-	-	-	-	5	-	5
Level 5 (40-50 cm)	-	-	-	-	-	-	-	-	0
Level 6 (50-60 cm)	-	-	-	-	-	-	1	-	1
Level 7 (60-70 cm)	-	-	-	-	-	-	-	-	0
Level 8 (70-80 cm)	-	-	-	-	-	1	1	-	2
Level 9 (80-90 cm)	-	-	-	-	-	-	1	-	1
Level 10 (90-100 cm)	-	-	-	-	-	-	-	-	0
Level 11 (100-110 cm)	-	-	-	-	-	-	-	-	0
Feature 2 (36-58 cm)	-	-	-	-	-	-	2	-	2
Subtotals	0	0	0	0	0	1	30	0	31
TEST UNIT 2									
Level 1 (0-10 cm)	-	-	-	-	-	-	1	-	1
Level 2 (10-20 cm)	1	1	-	1	-	-	48	-	51
Level 3 (20-30 cm)	-	-	-	-	-	-	9	-	9
Level 4 (30-40 cm)	-	-	-	-	-	-	3	-	3
Level 5 (40-50 cm)	-	-	-	-	1	-	7	-	8
Level 6 (50-60 cm)	-	-	-	-	-	-	12	-	13
Feature 3 (60-90 cm)	-	-	-	-	-	-	14	-	14
Level 9 (80-90 cm)	-	-	-	-	-	-	3	-	3
Level 10 (90-100 cm)	-	-	-	-	-	-	3	-	3
Level 11 (100-110 cm)	-	-	-	-	-	-	2	-	2
Level 12 (110-120 cm)	-	-	-	-	-	2	5	-	7
Level 13 (120-130 cm)	-	-	-	-	-	-	1	-	1
Level 14 (130-140 cm)	-	-	-	-	-	-	-	-	0
Subtotals	1	1	1	1	1	2	108	0	115

Table 10, continued

Provenience	Dart Point	Side Scraper	Miscellaneous Uniface	Spokeshave	Cobble Tool	Edge- modified Flakes	Unmodified Debitage	Unmodified Shells	Totals
TEST UNIT 3									
Level 1 (0-10 cm)	-	-	-	-	-	-	-	-	0
Feature 1 (10-32 cm)	-	-	-	-	-	-	2	-	2
Level 3 (20-30 cm)	-	-	-	-	-	-	-	1	1
Level 4 (30-40 cm)	-	-	-	-	-	-	-	2	2
Level 5 (40-50 cm)	-	-	-	-	-	-	-	-	0
Level 6 (50-60 cm)	-	-	-	-	-	-	-	-	0
Subtotals	0	0	0	0	0	0	2	3	5
Totals	1	1	1	1	1	3	140	3	151





**Figure 15.** View to the north of Feature 2, Test Unit 1, 41CV947.

microdebitage but were not submitted for macrobotanical analysis. Burned rocks were exposed in all three walls (east, south, and west) of the test unit and in the north and south walls of Backhoe Trench 1 for 5 m to the east and 1 m to the west of the test unit. Based on these exposures, the occupation zone encompassing Feature 3 measures at least 7 m east-west by 2 m north-south.

### Discussion

Testing of 41CV947 revealed the presence of stratigraphically discrete cultural deposits buried in the Paluxy sand. Utilization of the area during the Late Archaic period is indicated by the calibrated charcoal radiocarbon dates of A.D. 90–210 and A.D. 645–685, associated with Features 2 and 1, respectively. The chronometric data and the presence of three intact features suggest repeated occupations during this time period. Exposures of cultural materials in

backhoe trench walls, test unit profiles, and road cuts suggest that these features are associated with more-extensive occupation zones. Charred oak wood and nutshell fragments (possibly pecan and walnut) from a hearth represent fuel and food resources. Although the nearest perennial stream, Cowhouse Creek, is ca. 2 km to the south, subsistence also included a reliance on aquatic resources based on the occurrence of mussel shells. Overall, the lithic assemblage consists of expedient and formal tools and a moderate amount of debitage. The test excavations also demonstrated that preservation of charred organic remains within feature contexts is good. Since site 41CV947 can contribute substantial data about sites located in the Paluxy setting, it is recommended as eligible for listing in the National Register of Historic Places (NRHP).

### 41CV984

#### Site Setting

Site 41CV984 is situated on a gentle north-northwest-facing slope just south of an unnamed tributary of Cottonwood Creek and east of a major tank trail. A cleared road easement along the eastern site margin and a few two-track roads are the only visible disturbances. The majority of the site supports mesquite, persimmon, juniper, and post oak trees, along with a thick understory growth. Site elevation is 270 m above mean sea level.

#### Previous Work

Mesrobian and Kooren (Texas A&M University) recorded the site on 20 January 1986. Measuring 50 m north-south by 25 m east-west, the site consisted of a burned rock mound surrounded by scattered burned rocks and lithic artifacts. The mound was 10 m in diameter and appeared to be in remarkably good condition. One dart point, initially identified as a Frio but later retyped as a Martindale, was collected. An estimated 67 percent of the site was impacted by road construction, vehicular traffic, and erosion.

On 3 November 1992, Turpin and Frederick (Mariah Associates) revisited the site. Based on the exposed cultural materials and geomorphic observations, site dimensions were expanded to

90 m north-south by 70 m east-west. The soil profile across the site appeared to consist of an A-R profile less than 30 cm thick. The sandy material comprising the dark brown A horizon seemed to be weathered from the Paluxy sand, which cropped out immediately upslope of the site. Two small remnants of an argillic (Bt) horizon suggested greater soil complexity than would normally be expected in this setting. At the eastern site margin, two burned rock features were exposed within a cleared road easement. The previously recorded burned rock mound (designated Feature 1) was severely impacted and deflated, and vehicle tracks were visible across the surface of the feature. Feature 2, a burned rock concentration or possible midden, was 10 m in diameter and appeared relatively intact. Burned rocks were scattered across the general area surrounding the features, but soil probes there did not exceed 30 cm. A lack of exposures precluded evaluating the context of the cultural materials, but they were thought to be shallowly buried. Due to the potential for subsurface archeological materials, shovel testing was warranted.

On 7 December 1992, a crew excavated seven shovel tests. Only two shovel tests (28.6 percent), placed on the features, produced cultural materials. One test excavated on Feature 1 contained dense amounts of burned rocks at 0–15 cm. A high density of burned rocks was found from 0–50 cm in the shovel test placed on Feature 2; the number of burned rocks per level generally decreased with depth. Five flakes were also recovered from 0–30 cm in Feature 2.

Shovel testing demonstrated that the site, and Feature 2 in particular, contained buried cultural deposits of unknown significance, potentially eligible for NRHP listing. The recommended testing effort included at least 2 m<sup>2</sup> of manually excavated test units in Feature 2 (Trierweiler, ed. 1994:A1130–A1132).

### **Work Performed**

Prior to excavation, the two previously recorded burned rock features (Features 1 and 2) were re-located and rerecorded. On 1 October 1996, Prewitt and Associates completed formal testing of 41CV984 (Figure 16). The test excavations included five 1x1 m test units (Test Units 1–5), with a total of 2.6 m<sup>3</sup> manually excavated. One Ellis point was surface collected.

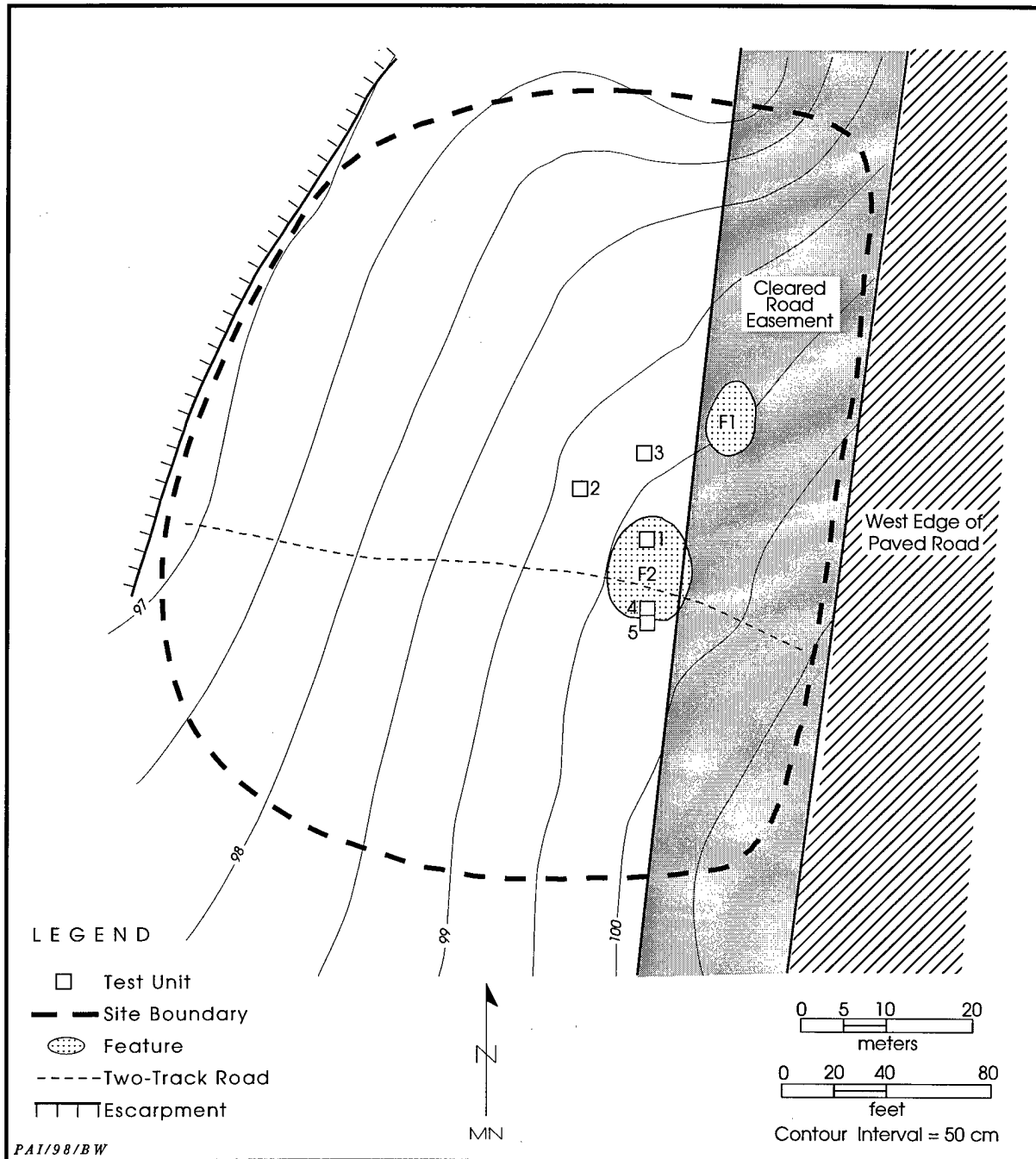
Test Unit 1 was placed about 1 m northwest of the previously excavated shovel test on Feature 2. Relative to the surrounding topography, Test Unit 1 was situated on the apex of a rise later determined to be a burned rock mound (Feature 2). Its excavation was terminated at 60 cm (3Btb horizon). Northwest and downslope of Test Unit 1, Test Unit 2 was excavated to weathered limestone at 30 cm. Test Unit 3 was excavated north of Test Unit 1 and southwest of Feature 1. This unit was terminated at 50 cm (2Bt horizon). Test Unit 4 was placed approximately 6 m south of Test Unit 1. A concentration of burned rocks encountered at 40–50 cm in the northern half of the unit were exposed and left in situ. In order to investigate this feature further, Test Unit 5 was excavated south of, and contiguous with, Test Unit 4. Excavations of both test units were halted at 60 cm (2Bt horizon).

### **Site Extent and Depth**

The natural landform is a colluvial slope that is well defined on three sides. It is delimited by a scarp on the northern and western boundaries and a paved road on the east. Although the Paluxy outcrop extends an unknown distance to the south, the deposits thin in this direction. Based on exposures of cultural materials, testing results, and topography, the areal extent of the site is defined as 90 m north-south by 80 m east-west. Test Units 1, 4, and 5 contained intact portions of Feature 2 and associated artifacts from the surface to a maximum depth of 60 cm.

### **Sediments and Stratigraphy**

The three test unit profiles examined at 41CV984 reveal a late Holocene sandy colluvium overlying a truncated late Pleistocene/Holocene argillic horizon. The late Holocene colluvial unit varies in thickness and pedogenic expression among the profiles of Test Units 1, 2, and 3 (Figure 17). The late Holocene colluvial unit exposed in Test Unit 1 is 40 cm thick and has an anthropogenic component to it. Two distinct zones were observed in this profile; the upper 5 cm consist of a very dark grayish brown sandy loam designated a C horizon and the lower zone (5–40 cm), designated a 2Ab horizon, is a very dark gray sandy loam encapsulating many densely packed pieces of burned rocks defined as Feature 2. The underlying truncated soil is a



**Figure 16.** Site map of 41CV984.

yellowish red sandy clay loam 3Btb horizon of late Pleistocene/Holocene age. The profile of Test Unit 2 reveals a 10-cm-thick late Holocene mantle of very dark grayish brown sandy loam (A horizon) overlying a late Pleistocene/Holocene reddish brown 2Bt horizon (10–25 cm). Glen

Rose limestone is present below the 2Bt horizon. The 48-cm-thick profile of Test Unit 3 consists of a 24-cm-thick late Holocene mantle of very dark grayish brown sandy loam (A horizon) overlying a truncated yellowish red late Pleistocene/Holocene 2Bt horizon.

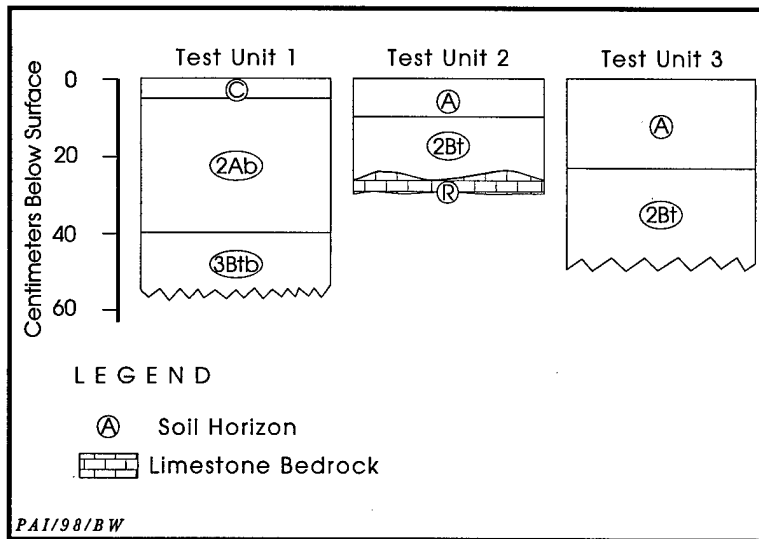


Figure 17. Stratigraphic profiles of Test Units 1, 2, and 3, 41CV984.

### Cultural Materials

Cultural materials were recovered in all five test units (Table 11). In Test Unit 1, Feature 2 was encountered from the surface to a maximum depth of 57 cm. The feature fill produced dense amounts of burned rocks throughout and sparse artifacts in the upper 20 cm (see Cultural Features). Although no artifacts were found during excavation of the matrix surrounding and directly beneath Feature 2 at 50–60 cm, a processed flotation sample contained three flakes and minimal amounts of charred wood.

From 0–30 cm, Test Unit 2 produced 49 pieces of debitage, 11 burned rocks (1 kg), and 2 miscellaneous unifaces. Approximately 65 percent of these cultural materials were found from 10–20 cm.

Test Unit 3 yielded a total of 50 flakes, 21 burned rocks (3 kg), and 1 dart point barb from 0–40 cm. Chunks of charcoal were found at 20–30 cm, and larger pieces of burned wood were present at 30–50 cm. Although most of the charcoal was located primarily in the center of the unit, no discrete outline or rock patterning was apparent. Although associated with cultural materials, the charred wood may be the result of a natural burn. Charcoal collected at 30 cm yielded a radiocarbon age of  $1130 \pm 80$  B.P. (Beta-102092, see Appendix A).

In Test Unit 4, each level from surface to 60 cm and the portion of the unit encompassing

Feature 2 at 40–50 cm (see Cultural Features) produced cultural materials. All of the nonfeature matrix produced 125 burned rocks (19.25 kg) and 149 flakes, with approximately 43 percent of these materials occurring at 30–40 cm. In addition, 1 late-stage/finished biface, 2 miscellaneous unifaces, and 1 edge-modified flake were recovered from 30–60 cm; Level 4 (30–40 cm) contained a Zephyr point recycled into a burin.

Due to the slope of the ground surface, Level 1 (0–10 cm) was confined to the southeast quadrant of Test Unit 5 and produced only 3 burned rocks. Level 2 (10–20 cm) contained 24 burned rocks (3.25 kg) and 4 flakes, in addition

to glass and tin fragments that indicate mixed deposits. Present from 20–60 cm, Feature 2 yielded dense amounts of cultural materials (see Cultural Features). At 50–60 cm, 7 burned rocks (0.5 kg) were scattered in the matrix surrounding the feature. In the northeast corner of Test Unit 5, a pocket of *Rabdotus* shells was observed at 55–60 cm at the base of Feature 2; 12 shells were collected.

### Cultural Features

Feature 1 was previously recorded as a deflated burned rock mound. This feature is now located in the middle of a cleared road easement and has been severely impacted. Angular burned rocks and associated debitage are confined to an area measuring 8 m north-south by 4.5 m east-west. These materials rest on caliche and weathered bedrock, indicating that extensive erosion and deflation has occurred. This feature is virtually destroyed, and no test excavations were placed on it.

Previously described as a burned rock concentration or possible midden, Feature 2 was re-located south-southwest of Feature 1. The cleared road easement crosses the eastern half of this feature, and it is bisected by an east-west, two-track road. Feature 2 was encountered in Test Units 1, 4, and 5.

In Test Unit 1, the feature extended across the entire unit from 0–50 cm, but was confined

Table 11. Summary of cultural materials from 41CV984

Provenience	Dart Points	Late-stage/ Finished Bifaces	Miscellaneous Biface	Miscellaneous Unifaces	Graver/Burin	Edge-modified Flakes	Unmodified Debitage	Totals
<b>TEST UNIT 1</b>								
Feature 2 (0-10 cm)	-	1	-	-	-	-	5	6
Feature 2 (10-20 cm)	-	-	-	-	-	-	2	2
Level 3 (20-30 cm)	-	-	-	-	-	-	-	0
Level 4 (30-40 cm)	-	-	-	-	-	-	-	0
Level 5 (40-50 cm)	-	-	-	-	-	-	-	0
Level 6 (50-60 cm)	-	-	-	-	-	-	3	3
Subtotal	0	1	0	0	0	0	10	11
<b>TEST UNIT 2</b>								
Level 1 (0-10 cm)	-	-	-	-	-	-	14	14
Level 2 (10-20 cm)	-	-	-	2	-	-	32	34
Level 3 (20-30 cm)	-	-	-	-	-	-	3	3
Subtotals	0	0	0	2	0	0	49	51
<b>TEST UNIT 3</b>								
Level 1 (0-10 cm)	-	-	-	-	-	-	1	1
Level 2 (10-20 cm)	-	-	-	-	-	-	2	2
Level 3 (20-30 cm)	1	-	-	-	-	-	36	37
Level 4 (30-40 cm)	-	-	-	-	-	-	11	11
Level 5 (40-50 cm)	-	-	-	-	-	-	-	0
Subtotals	1	0	0	0	0	0	50	51
<b>TEST UNIT 4</b>								
Level 1 (0-10 cm)	-	-	-	-	-	-	-	0
Level 2 (10-20 cm)	-	-	-	-	-	-	10	10
Level 3 (20-30 cm)	-	-	-	-	-	-	20	20
Level 4 (30-40 cm)	-	1	-	-	1	-	105	107
Level 5 (40-50 cm)	-	-	-	2	-	-	8	10
Feature 2 (40-50 cm)	-	-	-	-	-	-	5	5
Level 6 (50-60 cm)	-	-	-	-	-	1	6	7
Subtotals	0	1	0	2	1	1	154	159
<b>TEST UNIT 5</b>								
Level 1 (0-10 cm)	-	-	-	-	-	-	-	0
Level 2 (10-20 cm)	-	-	-	-	-	-	4	4
Feature 2 (20-30 cm)	-	-	-	-	-	1	24	25
Feature 2 (30-40 cm)	-	2	1	-	-	-	57	60
Feature 2 (40-50 cm)	-	-	-	-	-	-	51	51
Feature 2 (50-60 cm)	-	-	-	-	-	-	2	2
Level 6 (50-60 cm)	-	-	-	-	-	-	-	0
Subtotals	0	2	1	0	0	1	138	142
<b>GENERAL COLLECTION</b>								
Surface	1	0	0	0	0	0	0	1
Totals	2	4	1	4	1	2	401	415

primarily to the northwest quadrant of the test unit at 50–57 cm (maximum depth). A total of 2,813 burned rocks (479 kg), 7 flakes, and 1 late-stage/finished biface were encountered from 0–20 cm; the overwhelming majority of burned rocks were fist-sized and smaller angular pieces. In contrast, approximately 70 percent of the burned rocks from 20–57 cm were tabular pieces ranging in size from 5 to 25 cm. All of the burned rocks were nonfossiliferous limestone. Processed flotation samples collected from Levels 2–4 (10–40 cm) contained minimal amounts of charred wood. A flotation sample collected from 40–50 cm contained no charred macrobotanical remains (see Appendix E). Charcoal recovered at 40–50 cm yielded a radiocarbon age of  $2750 \pm 40$  B.P. (Beta-102093, see Appendix A).

At 40–50 cm in Test Unit 4, Feature 2 was confined primarily to the northern three-quarters of the unit. Consisting of one to two burned rock layers, the feature fill contained 128 burned rocks (27.25 kg) and 5 flakes. All of the burned rocks were nonfossiliferous limestone, and most were tabular and medium-sized pieces.

Feature 2 was present across Test Unit 5 from 20–50 cm. At 50–60 cm, it was restricted to the northern one-third of the test unit and along the west wall. A total of 1,035 burned rocks (237.75 kg), 134 flakes, 2 late-stage/finished bifaces, 1 miscellaneous biface, and 1 edge-modified flake were found in the feature fill. The majority of the burned rocks were less than 15 cm in size and were nonfossiliferous limestone (1 piece was sandstone). The feature rocks include approximately equal percentages of blocky, angular fragments and flat, tabular pieces. Processed flotation samples collected from 40–60 cm contained low frequencies of microdebitage and charred wood. A flotation sample collected from 30–40 cm yielded no charred macrobotanical remains (see Appendix E).

Feature 2 is spatially discrete and is interpreted as a partially buried, domed, burned rock mound. Topographically, a subtle “mounded” surface is apparent, with the highest elevation in the immediate vicinity of Test Unit 1, but no evidence of a central depression is visible. The test excavations reveal that the buried mound has a maximum thickness of almost 60 cm near its center, but it tapers down to 10 cm thick at the southern margin (Figure 18). Although not fully demonstrated at this time, the feature is probably thickest at its apex and becomes pro-

gressively thinner near its perimeter in all directions. Based on topography, exposures of cultural materials, and formal testing results, Feature 2 is estimated to be about 10 m in diameter. Disturbances along the road easement are evidenced by burned rocks resting on weathered bedrock. Albeit severe, this impact has only affected the eastern edge of Feature 2. A large portion of the mound remains intact. The excavated portions of Feature 2 are disturbed only minimally by root activity.

## Discussion

Testing of 41CV984 reveals that Feature 2 is a spatially discrete burned rock mound resting on a truncated late Pleistocene surface and buried in Paluxy-derived sediments. A calibrated charcoal radiocarbon date of 915–830 B.C. (see Appendix A) near the base of the thickest portion of the mound suggests initial utilization of the site began during the middle of the Late Archaic period. The association of a Zephyr point just beyond the downslope margin of Feature 2 suggests that the feature continued to be used throughout the latter half of the Late Archaic. Charcoal collected from a nonfeature context (i.e., Test Unit 3 at 30 cm) produced a calibrated charcoal radiocarbon date of A.D. 855–1000 (see Appendix A). This date correlates to the Late Prehistoric period (Austin phase), but the dated sample may be the result of a noncultural event (e.g., a natural burn) since charred wood was scattered throughout the sediments from 20–50 cm.

Although a discrete internal feature (i.e., a hearth or earth oven) was not encountered within Feature 2, this potential is considered high given the small size and relative intactness of the domed mound. In general, the lithic assemblage includes both formal and expedient tools, in addition to a high frequency of debitage. The 50-cm-thick upslope portion of the feature produced 1.6 artifacts per 10-cm level (Test Unit 1), whereas 136 artifacts were recovered from three levels (Test Unit 5) in the downslope portion of the mound. This higher frequency of artifacts in the downslope margin of the feature may represent a real spatial phenomenon in which most activities occurred away from a central, internal feature. Although macrobotanical remains were lacking, this may be a result of limited sampling. The presence of charcoal demonstrates that perishable organic materials are



a



b

**Figure 18.** Profile photographs of Feature 2, 41CV984. (a) Burned rocks exposed in the north wall of Test Unit 5; (b) burned rocks exposed in the west walls of Test Units 4 and 5.

preserved. Based on the testing results, site 41CV984 has a high archeological research potential and is recommended as eligible for listing on the NRHP.

#### 41CV988

##### Site Setting

Site 41CV988 is situated on an upland

(Killeen) slope east of an unnamed tributary of Cottonwood Creek (Figure 19). The site is bounded by a borrow pit along the southern margin and large tank trails on the east and west. Several smaller military trails transect the site. Vegetation consists of patches of juniper and hardwood trees separated by open grassy areas. Site elevation is 275 m above mean sea level.

##### Previous Work

Frye, Mesrobian, and Dureka (Texas A&M University) recorded the site on 10 February 1986. The site had dimensions of 190x185 m and contained burned rock mounds, concentrations, and scatters. None of the areas of burned rocks were formally designated as features, but one of the mounds was depicted on the site map at the west-central site margin. Metate fragments and a low density of flakes were observed and two manos, a hammerstone, a biface, and two dart points were collected. It was noted that the ground stone artifacts appeared to be associated with the burned rock areas. An estimated 60 percent of the site was disturbed by erosion and vehicular traffic. A portion of a historic homestead (site FN1452) overlaps the north-eastern margin of the site.

The site was revisited on 2 November 1992 by Turpin and Frederick (Mariah Associates).

Based on cultural material exposures, site dimensions were reduced to 125 m east-west by 80 m north-south. The site was situated on a gently sloping, flat to slightly convex slope formed across an outcrop of Paluxy sand. Soils exposed in numerous disturbed areas, rills, and trails were interpreted as alfisols and exhibited A-AE-Bt soil profiles in most places, although an A-C profile was also noted. The site was divided into Subareas A and B based solely on differing

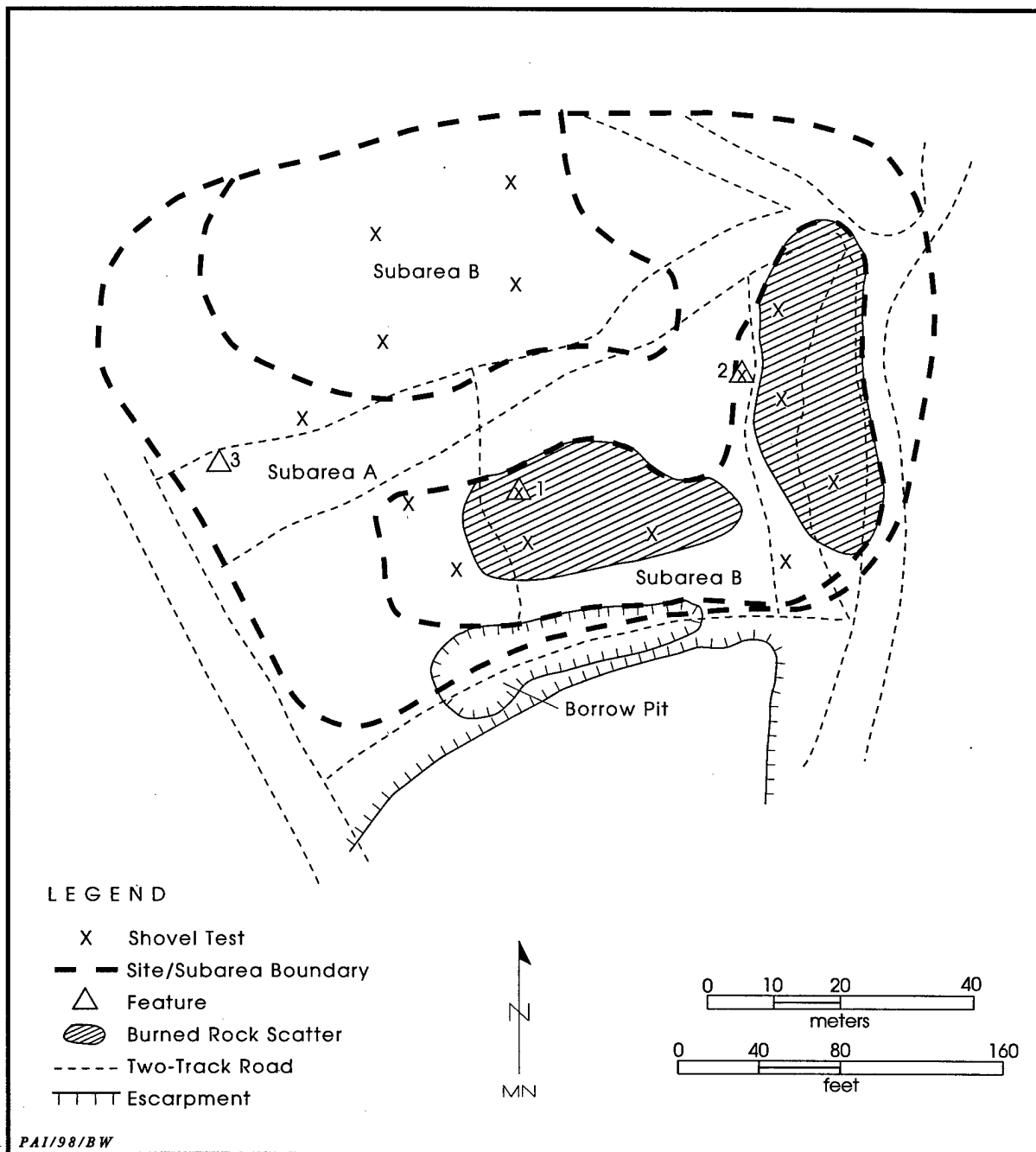


Figure 19. Site map, 41CV988 (modified from Trierweiler, ed. 1994:A1134).

degrees of disturbance. However, researchers noted that "the distribution of the two subareas is too complex to be adequately portrayed on the site map" (Trierweiler, ed. 1994:A1133). Nonetheless, Subarea A was generally defined as the deflated and eroded central portion of the site encompassing open areas that were heavily impacted by

tanks and other vehicular traffic. The burned rock mound depicted on the 1986 site map was re-located and designated as Feature 3 within Subarea A. It measured 10 m in diameter and was reduced to two small burned rock concentrations due to severe disturbance by vehicular traffic. Given the degree of disturbance to the



deposits in Subarea A, the investigators judged that no further work was necessary.

Subarea B was defined as the remaining portions of the site, which were considered protected areas or "islands" of intact sediments adjacent to trees and other clumps of vegetation. These areas had potential to contain shallowly buried cultural deposits. These remnant islands of intact sediments are located between the heavily impacted and deflated areas, primarily in the southern and southwestern portions of the site. Two features were identified where burned rock scatters were previously noted. Feature 1 was described as a 25-m-diameter, surficially disturbed burned rock concentration located in the south-central portion of the site. Feature 2, situated along the eastern edge of the site, was a 125x20-m burned rock scatter with internal concentrations. The investigators noted that Feature 2 was impacted by erosion, vehicular traffic, and construction activities. Shovel testing was recommended for Subarea B.

On 7 December 1992, a crew excavated 15 shovel tests in Subarea B to a depth of 40 cm or less. Recovery included 185 burned rocks, 14 flakes, and a charcoal sample from seven tests placed in the southern portion of the subarea. Shovel tests in the northern section were culturally sterile. These results indicated that the southern portion of Subarea B contained intact cultural deposits of unknown significance which might be potentially eligible for listing on the NRHP. A minimum testing effort of 3–4 m<sup>2</sup> of manually excavated test units and radiometric analysis of the recovered charcoal sample were recommended to determine the NRHP eligibility of the southwestern part of Subarea B (Trierweiler, ed. 1994:A1133–A1135).

### Work Performed

Prior to excavation, the two previously recorded burned rock features (Features 1 and 2) in Subarea B were re-located. The features appeared unchanged since their original recording. On 30 September 1996, Prewitt and Associates completed formal testing of the southwestern portion of 41CV988 (Figure 20). This testing was confined primarily to the southwestern portion of what was originally defined as Subarea B, but the subarea distinctions were ignored because they were extremely arbitrary and virtually meaningless. The test excavations included

eight test units (Test Units 1–8), with a total of 3.75 m<sup>2</sup> manually excavated. Test Unit 1 had maximum dimensions of 1.5 m east-west by 1 m north-south. Test Units 2–7 measured 1x1 m. A Pedernales point recycled into a burin and one untypeable dart point were surface collected.

Excluding Test Units 3 and 6, all of the test excavations were terminated on the 2Bt horizon at various depths. Test Unit 1 was placed adjacent to Feature 2, where burned rocks were exposed in and along a road; the unit was excavated to a maximum depth of 43 cm. Placed 20 m northeast (downslope) of Test Unit 1, Test Unit 2 was excavated to 40 cm on a vegetated island between two eroded tank trails. Test Unit 3 was placed 4–5 m east of Feature 1 where burned rocks were exposed in a roadcut. This test unit encountered weathered Paluxy sandstone at 50–70 cm. Excavated to 30 cm, Test Unit 4 was placed between Test Units 1 and 2. Test Unit 5, located about 3 m north (downslope) of Test Unit 2, was excavated to 60 cm. Approximately 8 m east of Test Unit 3, Test Unit 6 encountered limestone gravels at 22–27 cm. Excavated to 50 cm, Test Unit 7 was located the farthest downslope (north), approximately 20 m northwest of Test Unit 5. Test Unit 8 was placed adjacent to burned rocks eroding from a tank trail near the southeastern site boundary. Its excavation was halted at 50 cm.

### Site Extent and Depth

The southern edge of the site is delimited by exposures of Walnut clay. The Paluxy sands thin dramatically to the north, east, and west. Based on the present exposure of cultural materials and testing results, the maximum site dimensions are 135 m north-south by 115 m east-west. The vertical extent of cultural deposits is represented by Features 2A and 4 (hearths) at 9–43 cm and 19–41 cm, respectively.

Although the test units were confined to the southwestern portion of Subarea B, excavation results demonstrate that the division of the site into different subareas based only on disturbed vs. undisturbed surface manifestations is dubious. Although located in an open, heavily disturbed area along an arbitrarily drawn margin of Subarea B, Feature 2A was found to be shallowly buried but fully intact in Test Unit 1. Since the adjacent surface (designated Subarea A) just west and north of this excavation is similar, it is

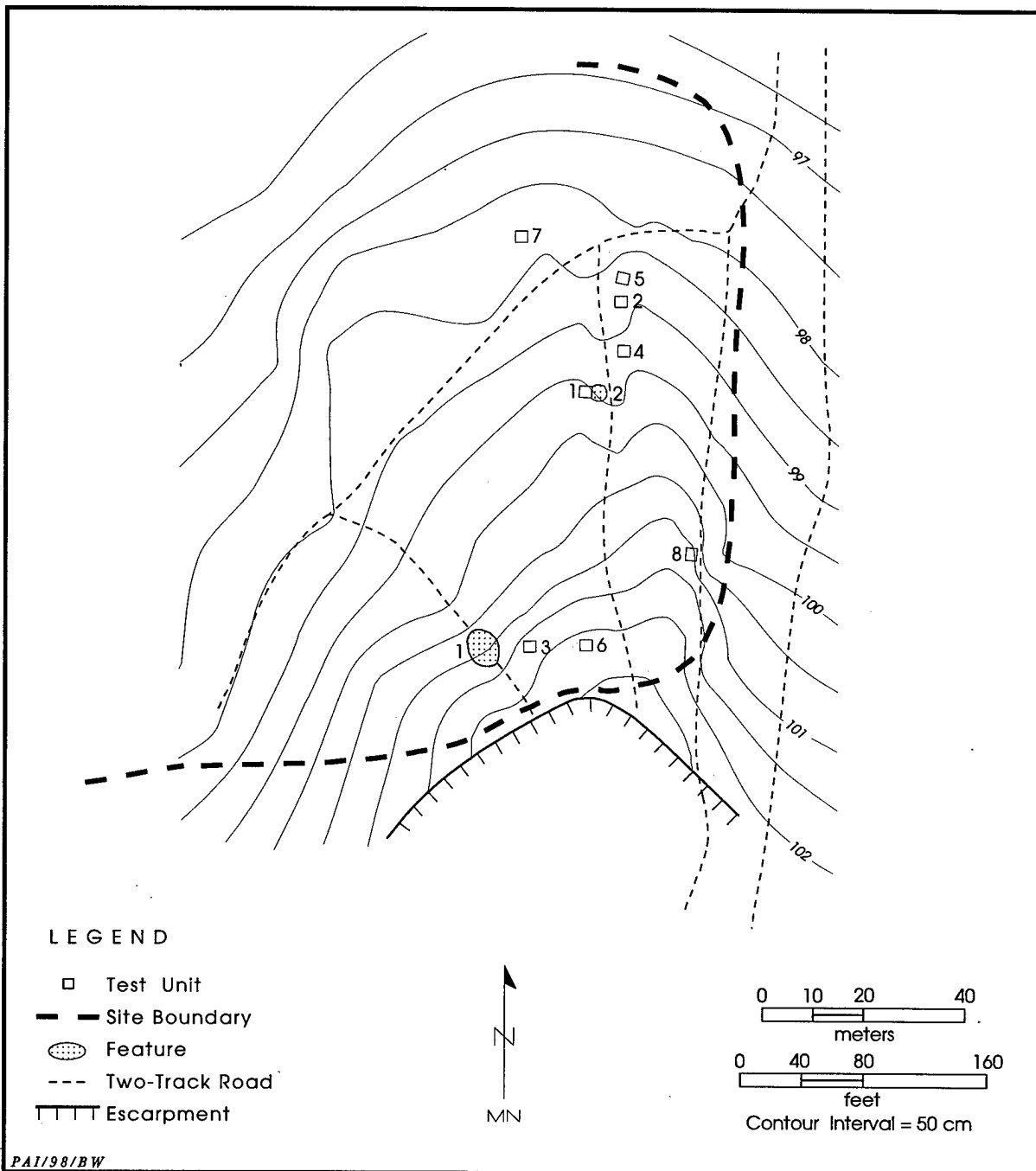


Figure 20. Map of southwestern portion of 41CV988.

possible that intact subsurface cultural deposits may occur here or elsewhere in Subarea A. Consequently, this investigation chose to ignore the previously defined subareas since the entire site has potential for intact cultural deposits in small, isolated pockets.

### Sediments and Stratigraphy

Cultural materials and features at 41CV988 are encapsulated in a thin late Holocene colluvial mantle of sandy sediments derived from the Paluxy Formation upslope. This mantle varies

in thickness and pedogenic expression across the site. On the lower slopes of the site, the mantle rests on a truncated late Pleistocene/Holocene soil; however, it rests on weathered Paluxy sandstone on the upper slopes (Figure 21).

The profile of Test Unit 1 consists of a 12-cm-thick late Holocene brown to dark brown loamy fine sand exhibiting an A horizon. It rests on a truncated, red 2Bt horizon (12–25+ cm) imprinted on a late Pleistocene/Holocene colluvial deposit. The profile of Test Unit 2 consists of a 33-cm-thick late Holocene colluvial mantle expressing a brown to dark brown loamy fine sand Cu horizon overlying a dark grayish brown fine sand 2Ab horizon. The late Holocene colluvial mantle overlies a truncated yellowish red 3Btb horizon (33–43+ cm), which is imprinted on a late Pleistocene/Holocene sandy clay loam colluvium. The late Holocene colluvial mantle observed in the profile of Test Unit 7 is 37 cm thick and exhibits a cumulic A1-A2 soil. This soil overlies a truncated reddish brown clay loam soil (2Bt horizon) formed on late Pleistocene/Holocene colluvium. Upslope in Test Unit 3, the late Holocene colluvial mantle is 53-cm-thick and rests on a weathered, white fine-grained Paluxy sandstone. The late Holocene mantle exhibits a

dark grayish brown A horizon over a brown to dark brown E horizon.

### Cultural Materials

Cultural materials were recovered in all eight of the test units (Table 12), but Test Unit 3 produced only burned rocks. Two buried features (see Cultural Features below) were encountered. Feature 2A extended to a maximum depth of 43 cm in Test Unit 1, but the area surrounding this intrusive hearth was only excavated to 30 cm (2Bt horizon). From 0–20 cm, the nonfeature matrix produced 45 burned rocks (18 kg), 38 flakes, 1 edge-modified flake, and 1 Darl point. Level 3 yielded 1 flake.

From 0–30 cm, Test Unit 2 contained considerable amounts of prehistoric cultural materials, including a Darl point at 20 cm. In addition, the presence of numerous recent items indicates that the upper 30 cm of fill is severely disturbed. Ten flakes were recovered from 30–40 cm.

In Test Unit 3, three of seven levels at 10–40 cm yielded a total of 56 burned rocks (3.25 kg). The overwhelming majority were highly fragmented and pea sized. Although this unit was located about 5 m east of Feature 1, no evidence

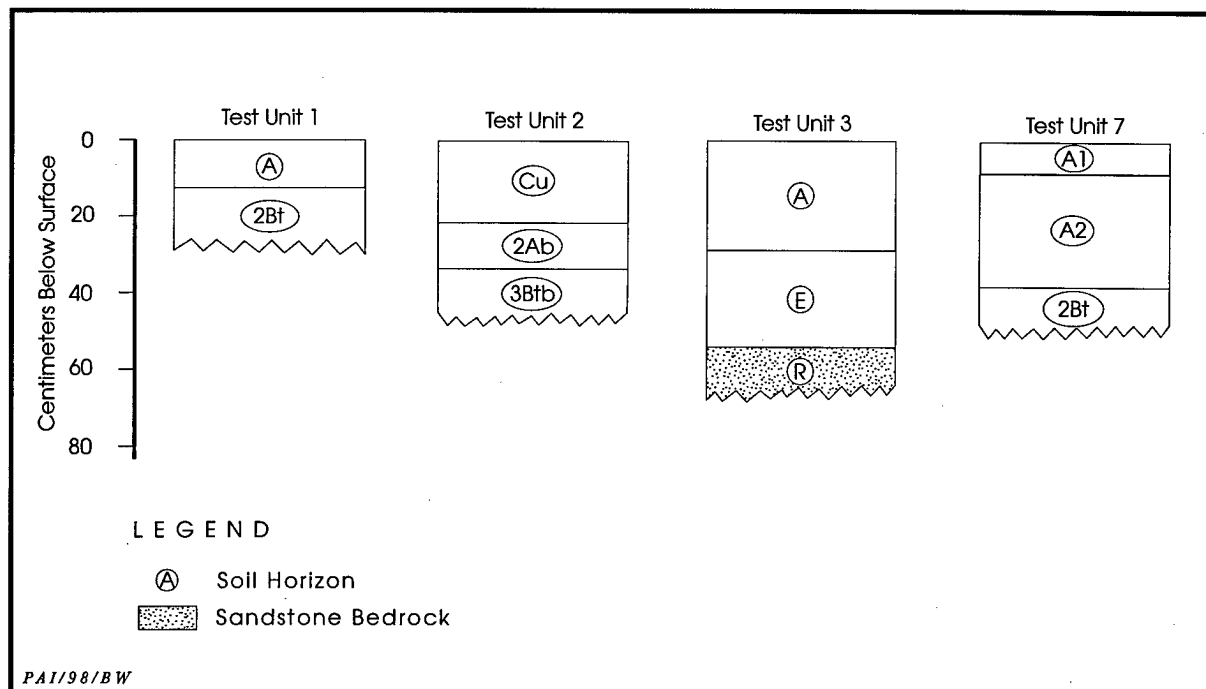


Figure 21. Profiles of Test Units 1–3 and 7, 41CV988.

Table 12. Summary of cultural materials from 41CV988

Provenience	Dart Points	Miscellaneous Biface	Graver/Burin	Edge-modified Flakes	Mano/ Hammerstone	Unmodified Debitage	Unmodified Bones	Totals
<b>TEST UNIT 1</b>								
Level 1 (0-10 cm)	-	-	-	1	-	12	-	13
Level 2 (10-20 cm)	1	-	-	-	-	26	-	27
Level 3 (20-30 cm)	-	-	-	-	-	1	-	1
Feature 2A (9-43 cm)	1	-	-	-	-	78	4	83
Subtotals	2	0	0	1	0	117	4	124
<b>TEST UNIT 2</b>								
Level 1 (0-10 cm)*	1	-	-	-	-	6	-	7
Level 2 (10-20 cm)*	1	1	-	-	-	84	-	86
Level 3 (20-30 cm)*	-	-	-	1	-	77	-	78
Level 4 (30-40 cm)	-	-	-	-	-	10	-	10
Subtotals	2	1	0	1	0	177	0	181
<b>TEST UNIT 4</b>								
Level 1 (0-10 cm)*	-	-	-	-	-	1	-	1
Level 2 (10-20 cm)*	2	-	-	-	-	12	-	14
Level 3 (20-30 cm)	-	-	-	-	-	3	-	3
Subtotals	2	0	0	0	0	16	0	18
<b>TEST UNIT 5</b>								
Level 1 (0-10 cm)*	-	-	-	-	-	11	2	13
Level 2 (10-20 cm)*	-	-	-	1	-	25	1	27
Level 3 (20-30 cm)	-	-	-	-	-	45	-	45
Level 4 (30-40 cm)	-	-	-	-	-	30	-	30
Level 5 (40-50 cm)*	1	-	-	-	-	56	-	57
Level 6 (50-60 cm)	-	-	-	1	1	8	-	10
Subtotals	1	0	0	2	1	175	3	182
<b>TEST UNIT 6</b>								
Level 1 (0-10 cm)*	-	-	-	-	-	3	-	3
Level 2 (10-20 cm)*	-	-	-	-	-	1	-	1
Level 3 (20-27 cm)*	-	-	-	-	-	-	-	-
Subtotals	0	0	0	0	0	4	0	4
<b>TEST UNIT 7</b>								
Level 1 (0-10 cm)*	-	-	-	-	-	1	-	1
Level 2 (10-20 cm)*	-	-	-	1	-	7	-	8
Level 3 (20-30 cm)*	-	-	-	-	-	13	-	13
Level 4 (30-40 cm)*	-	-	-	-	-	11	-	11
Level 5 (40-50 cm)	-	-	-	-	-	1	-	1
Subtotals	0	0	0	1	0	33	0	34
<b>TEST UNIT 8</b>								
Level 2 (10-20 cm)	-	-	-	-	-	1	-	1
Level 5 (40-50 cm)	1	-	-	-	-	-	-	1
Feature 4 (19-41 cm)	-	-	-	-	-	4	-	4
Subtotals	1	0	0	0	0	5	0	6
<b>GENERAL COLLECTION</b>								
Surface	1	0	1	0	0	0	0	2
Totals	9	1	1	5	1	527	7	551

\*Includes recent intrusive items.

of the burned rock concentration was encountered.

From 0–20 cm, Test Unit 4 contained sparse amounts of burned rocks, flakes, and recent intrusive items in a disturbed context. An untypeable dart point and one Ensor point were recovered at 10–20 cm. Level 3, apparently undisturbed, produced three flakes and five small burned rocks.

The upper 20 cm of Test Unit 5 consisted of disturbed deposits containing barbed wire, miscellaneous metal fragments, and one *Sus scrofa* (cf.) metapodial (i.e., domestic pig). Three burned rocks and 75 flakes were found from 20–40 cm. Level 5 yielded 56 flakes, an untypeable dart point, and a piece of metal. Although this could be evidence of disturbance, the sediments appeared to be intact and it is likely that the recent item was introduced through bioturbation or inadvertently fell into the lower deposits during excavation. An edge-modified flake, 8 flakes, and 1 quartzite mano/hammerstone were recovered from 50–60 cm.

A sparse amount of debitage and modern items was found in all three levels excavated in Test Unit 6, indicating that the deposits are disturbed and lack integrity.

Test Unit 7 produced a moderate quantity of prehistoric cultural materials and recent intrusive materials from 0–40 cm. One flake and five burned rocks were found from 40–50 cm.

In Test Unit 8, Feature 4 was present at 19–41 cm (see Cultural Features). From 0–50 cm, the nonfeature fill contained 29 burned rocks (1 kg), 1 flake, and 1 Edgewood point at 41 cm. Most of these cultural materials are associated with Feature 4.

### Cultural Features

Feature 2A is a basin-shaped hearth encountered from 9–43 cm in Test Unit 1 (Figure 22). Its maximum excavated dimensions are 1.0 m north-south by 1.1 m east-west. Although an unknown portion of the feature was destroyed in the tank trail, the estimated diameter of the complete hearth is 1.75 m. The hearth is a roughly circular cluster of five layers of burned rocks ( $n = 380$ , 172.25 kg). The majority of the rocks are nonfossiliferous limestone (97 percent), with the remainder being fossiliferous limestone. The overwhelming majority of the rocks are tabular and range in size from 25x15x5 cm to 5x5x3 cm.

The rocks exhibit no apparent patterning that would indicate a rock-lined hearth; rather, they seem to represent a random jumble of rocks mixed with organic-stained sediment. A distinct contact between the organic-stained feature fill and the surrounding matrix was observed at 25 cm. This contact appears to represent the edge of the hearth basin which was excavated into the lower 2Bt horizon. Patches of oxidized sediments were present along the sides of the basin beginning at 27 cm and extending to the base of the hearth at 43 cm. Four bones, 78 flakes, and 1 Darl point were recovered from the feature matrix. Charcoal collected near the base of the feature at 37 cm yielded a radiocarbon age of  $1280 \pm 40$  B.P. (Beta-102094, see Appendix A). A flotation sample of feature fill from 9–40 cm yielded charred macrobotanical remains of *Quercus* wood and indeterminate corm fragments (see Appendix E).

Encountered at 19–41 cm in Test Unit 8, Feature 4 is another basin-shaped hearth roughly circular in shape. The feature was entirely contained within the test unit and has maximum dimensions of 50 cm east-west by 40 cm north-south. It is composed of a single layer of 77 pieces (27 kg) of tabular burned limestone, ranging in size from 7x12x5 cm to 18x7x6 cm. Approximately 10 percent of the burned rocks consist of fossiliferous limestone, whereas the rest are nonfossiliferous. Charcoal flecking was noted throughout the feature fill, and the matrix produced four flakes. A radiocarbon age of  $1230 \pm 40$  B.P. was obtained on charcoal collected at 27 cm (Beta-102095, see Appendix A). A flotation sample collected at 19–40 cm contained *Quercus*, *Ilex*, and indeterminate woods, in addition to an indeterminate hardwood.

### Discussion

Features 2A and 4 (hearths) yielded calibrated charcoal radiocarbon dates of A.D. 685–785 and A.D. 770–875, respectively. These partially overlapping dates indicate that the site was occupied toward the end of the Late Archaic period, and possibly during the transition into the Late Prehistoric period, Austin phase. Associated with these features, one Edgewood and two Darl points approximate the dated components. Charred wood fragments identified as oak and holly represent fuel resources. The presence of burned storage root fragments (corms) in

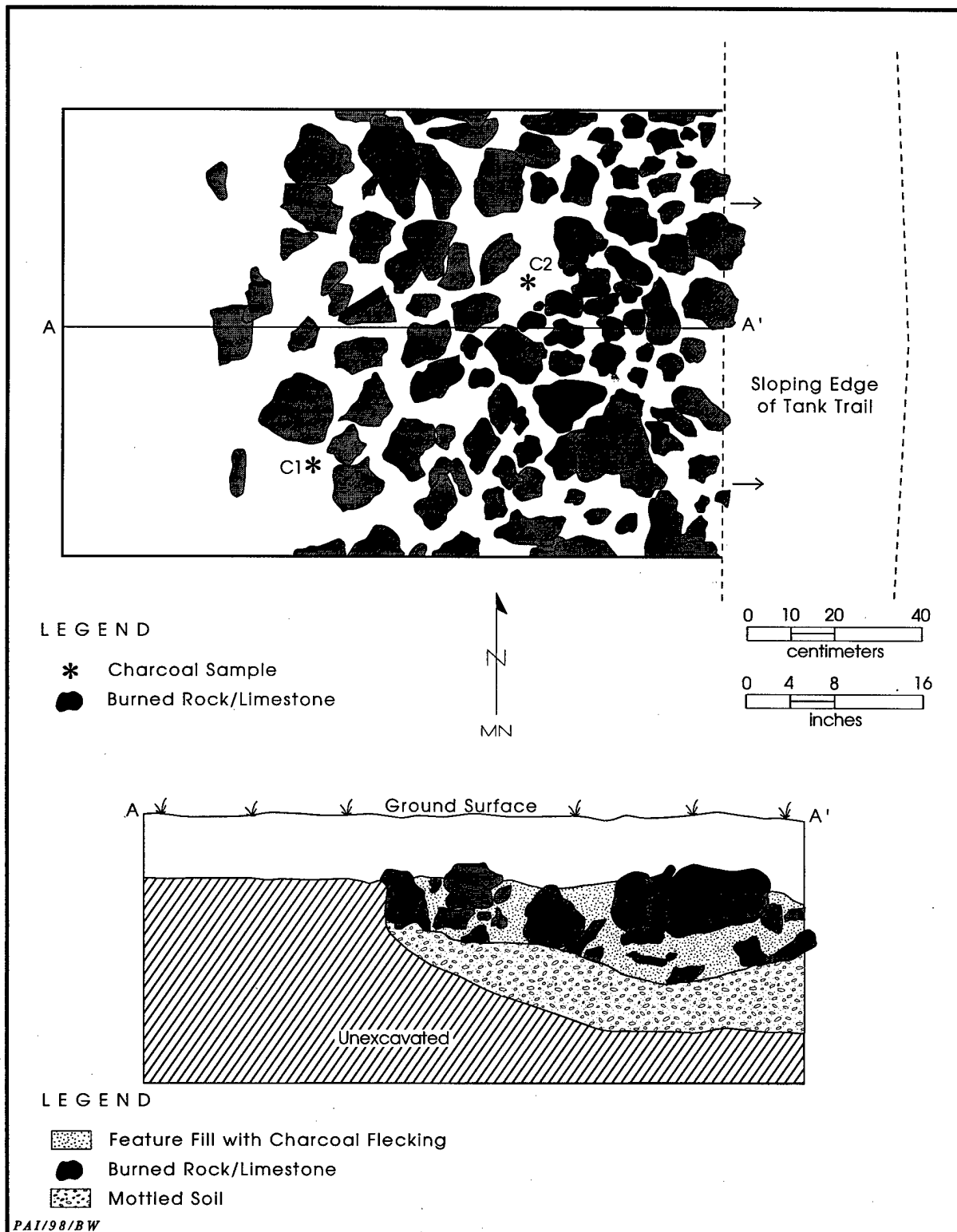


Figure 22. Plan and profile of Feature 2A, 41CV988.

Feature 2A demonstrate preservation of a food resource that can yield significant data about subsistence and paleoecology. Phil Dering of the Paleoethnobotanical Laboratory, Texas A&M University, notes that "the recovery of charred root material in a recognizable and potentially identifiable condition is a rare occurrence" (see Appendix E).

Some of the test excavations revealed disturbed sediments with intrusive materials (i.e., glass, metal, barbed wire, cartridge cases, and a pig bone) in the upper 20–40 cm of deposit. Evidence of disturbance is particularly apparent at the downslope margin of the site north of Test Unit 1. Here, four units contained mixed sediments probably indicative of recent slopewash, bioturbation, military impacts, and impacts from a historic homestead located near the northeast site margin. Although much of the site has been heavily impacted, areas where the disturbance is minimal retain a high degree of archeological potential.

As previously noted, division of the site into two subareas based on presence or absence of surficial disturbances, rather than meaningful geomorphic distinctions, is not productive. This fact is best represented by Feature 2A (exposed in Test Unit 1), which is technically located in the area previously defined as Subarea A. Although no further work was recommended for Subarea A, Feature 2A proved to be an intact hearth below a thin (ca. 10 cm or less) cap of disturbed surfaced deposits. Because portions of the site previously designated as having no archeological potential may contain intact subsurface deposits, the site should not be split into separate subareas. Therefore, all of site 41CV988 is recommended as eligible for listing in the NRHP. Testing results confirm that discrete features containing valuable information about food gathering and processing are present in thin deposits of Paluxy slopewash. However, past and present military impacts, the susceptibility of the sandy sediments to erosion, and the shallowness of the cultural deposits makes these components extremely vulnerable to damage. The military impacts are especially noticeable and are considered the greatest potential threat, particularly since the site has been, and continues to be, crisscrossed by tracked vehicles. This was strikingly apparent when revisiting the site after completion of formal testing. Imprints of tank treads were visible across the surface of the

recently backfilled Test Unit 1. Ongoing military activities such as this may destroy or seriously compromise the contextual integrity of these unique cultural deposits.

#### 41CV1043

##### Site Setting

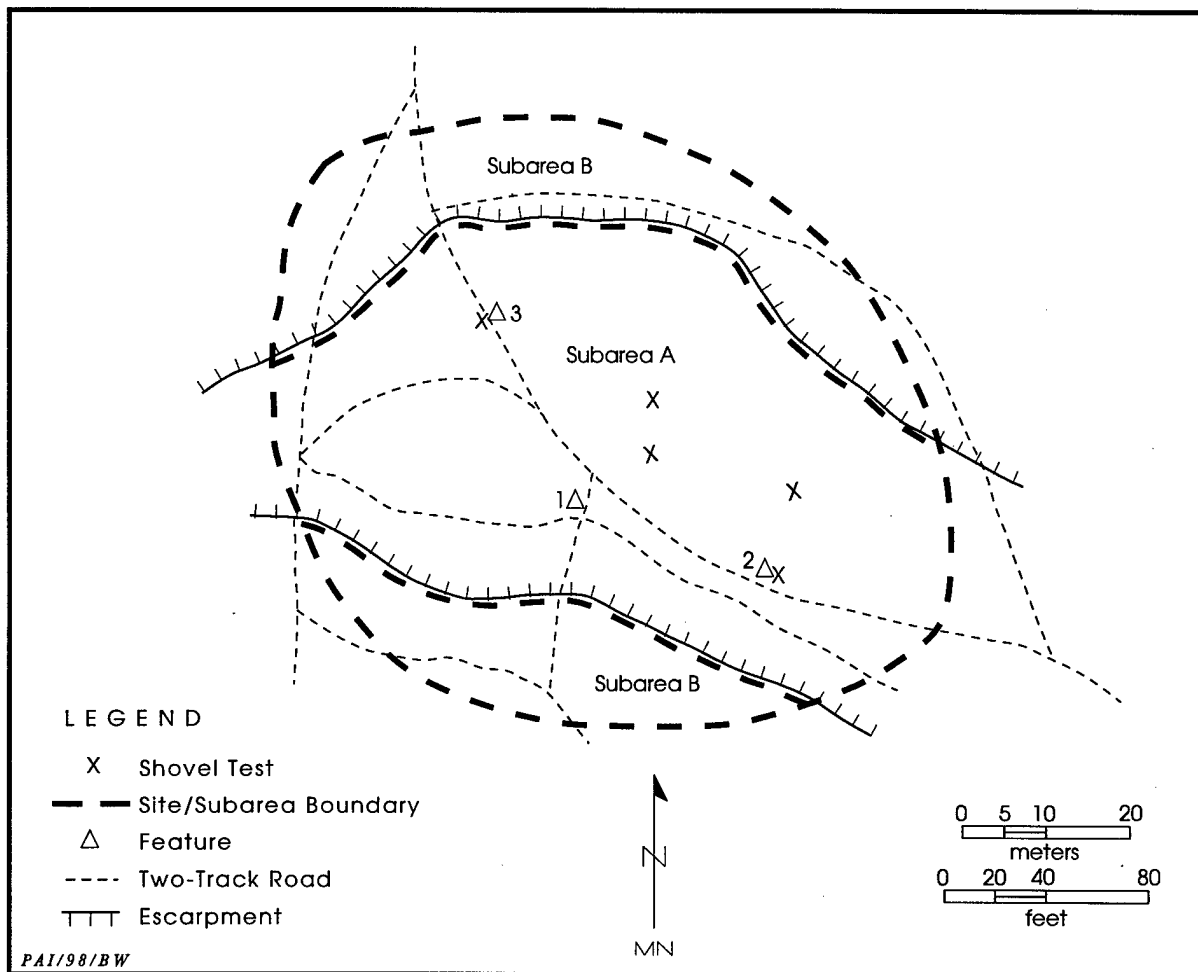
The site is situated on a gentle north-facing slope south of Cottonwood Creek and east of an unnamed tributary (Figure 23). Much of the area is vegetated with an open juniper-oak woodland. The site surface is obscured by leaf litter except in areas bisected by tank trails. These trails, along with subsequent gully erosion, are the primary impacts to the site. Site elevation is 270 m above mean sea level.

##### Previous Work

On 16 May 1985, Mesrobian and Turpin (Texas A&M University) recorded the site. Bifaces, cores, debitage, and burned rocks were scattered across an area measuring 100 m east-west by 75 m north-south. A burned rock concentration (possible mound) was exposed at the intersection of two tank trails. Five of seven collected projectile points were found at the northern (downslope) site boundary. An estimated 70 percent of the site was impacted by roads, tracked vehicles, and erosion.

Abbott and Kleinbach (Mariah Associates) revisited the site on 21 September 1992. Based on the extent of exposed cultural materials, the size of this open campsite was estimated to be 80 m east-west by 75 m north-south. The site was located on a sloping upland bench spanning an outcrop of Paluxy sand and extended upslope onto the Walnut clay and downslope onto the Glen Rose limestone. The site was divided into Subareas A and B on the basis of bedrock lithology.

Subarea A included the outcrop of Paluxy sandstone (consisting of a highly rubified Bts-K horizon sequence) where a truncated, strongly developed sandy soil underlay an accumulation of slopewash sediments less than 40 cm thick. Three burned rock features were exposed and identified in a tank trail. Feature 1, an extensively disturbed burned rock mound, measured 12x6 m and consisted of burned rocks, debitage, and charcoal-stained soil. Features 2 and 3 were burned rock concentrations (with associated



**Figure 23.** Site map, 41CV1043 (modified from Trierweiler, ed. 1994:A1192).

lithic artifacts) located 20 m east and 20 m northwest of Feature 1, respectively. Feature 2 measured 3x2 m and Feature 3 had dimensions of 6x3 m. Excluding these features, sparse amounts of burned rock and debitage were scattered in and adjacent to the tank trails. Since Subarea A had the potential to contain buried cultural deposits, shovel testing was recommended.

Situated above and below Subarea A, Subarea B consisted of the Walnut clay and Glen Rose limestone outcrops, respectively. These areas exhibited evidence of recent disturbances and erosional stripping. Sparse burned rocks and flakes were scattered across their surfaces. Due to the lack of appreciable deposition, no further work was recommended for Subarea B.

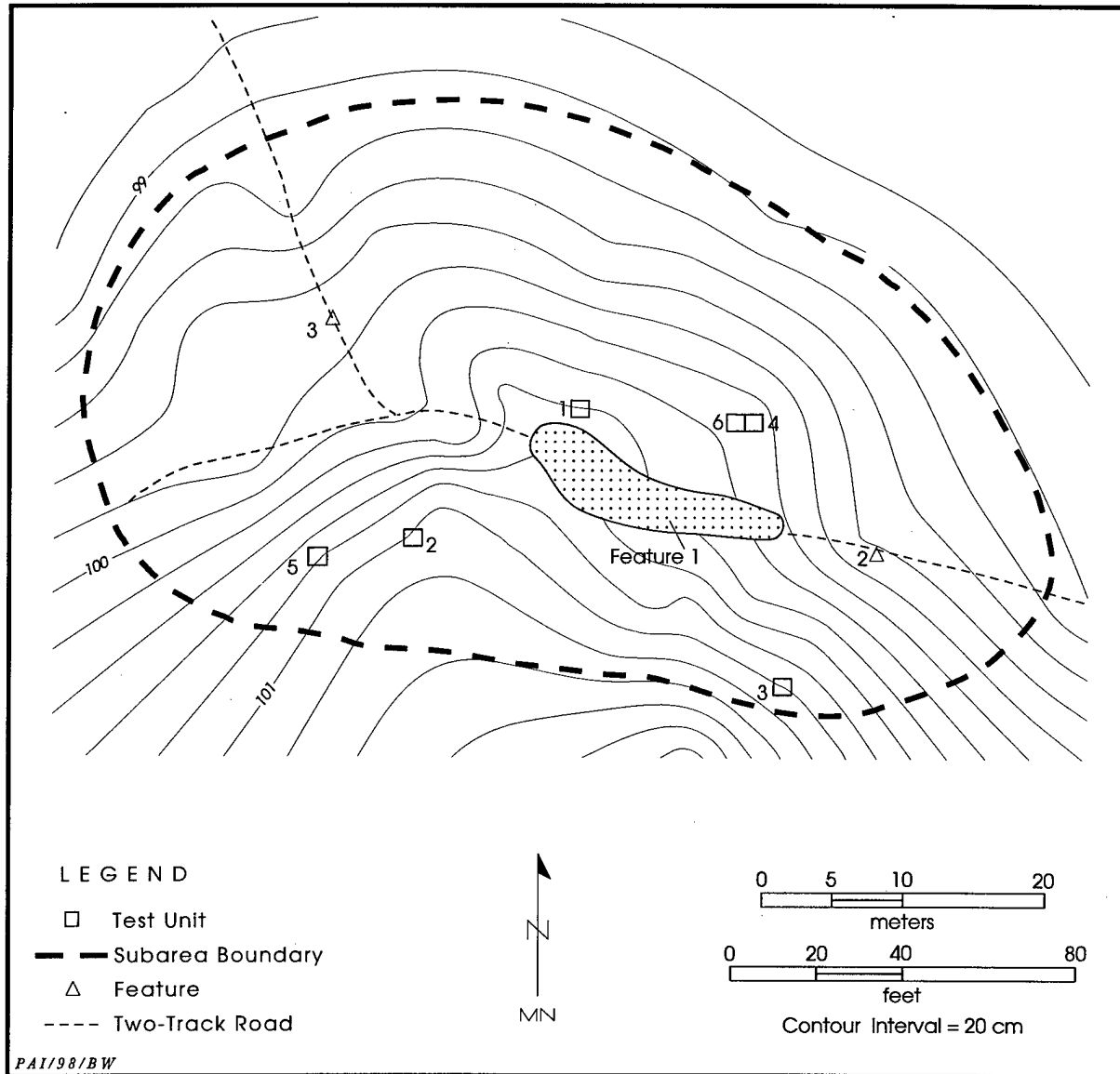
On 29 September 1992, a crew excavated five shovel tests in Subarea A. Shovel tests were

excavated adjacent to two of the three features, and three were placed in nonfeature contexts on the Paluxy bench. The shovel test excavated next to Feature 2 and one of the isolated shovel tests were sterile. The remaining three produced sparse cultural materials. Based on these results, researchers concluded that Subarea A might contain intact cultural deposits (albeit shallowly buried) of unknown significance. The recommended testing effort included a minimum of 1–2 m<sup>2</sup> of manually excavated test units (Trierweiler, ed. 1994:A1191–A1193).

### Work Performed

On 3 June 1996, Prewitt and Associates completed formal testing of Subarea A at 41CV1043 (Figure 24). The three previously identified





**Figure 24.** Map of Subarea A, 41CV1043.

burned rock features (Features 1–3) were re-located, but Feature 1 was found to be a larger burned rock mound or midden exposed along a tank trail. Test excavations included six 1x1-m test units (Test Units 1–6), each excavated to late Pleistocene-age sediments or weathered bedrock. A total of 3 m<sup>3</sup> was manually excavated.

Test Unit 1 was excavated to 50 cm ca. 1 m north (downslope) of the burned rock scatter. Situated 10 m southwest of Feature 1, Test Unit 2 was excavated to 30 cm. On the upslope margin of Subarea A and south of Feature 1, Test

Unit 3 was excavated to 70 cm. Excavated to 60 cm, contiguous Test Units 4 and 6 were located ca. 5 m northeast and downslope of Feature 1 and 10 m east of Test Unit 1. Test Unit 5 was excavated to 30 cm ca. 8 m west of Test Unit 2. Three test unit profiles were described, and soil geomorphology was assessed.

#### Site Extent and Depth

Site dimensions of 75x80 m remain unchanged from those defined in 1992. Based

on the exposure of cultural materials, features, and stratigraphic profiles, and the results of Test Units 1–3, buried cultural deposits in Subarea A cover an area 70 m east-west by 40 m north-south. The depth of the cultural materials varies slightly, but the majority were found from surface to a maximum depth of 40 cm. In addition, Feature 4 (a burned rock concentration) was encountered from 32–50 cm in Test Units 4 and 6.

### **Sediments and Stratigraphy**

The sediments and stratigraphy of site 41CV1043 reveal late Pleistocene- and Holocene-age colluvial and sheetwash deposits imprinted with a series of soils. The 48-cm-thick profile of Test Unit 1 consists of late Holocene and late Pleistocene to Holocene sandy colluvial sediments imprinted with an A-2Bt soil profile. The A horizon consists of a dark grayish brown fine sand, while the truncated 2Bt horizon is a yellowish red sandy clay loam. The profile of Test Unit 2 is very similar. The A horizon is 27 cm thick and consists of a very dark grayish brown fine sand. The 2Bt horizon is a strong brown very firm sandy clay loam.

The profile of Test Unit 3 consists of a slightly thicker late Holocene-age mantle. It is 39 cm thick and is imprinted with an A-Bw soil profile. The A horizon is a very dark gray firm loamy fine sand, while the Bw horizon is a dark grayish brown friable loamy fine sand. This soil overlies a truncated 2C soil formed on late Pleistocene- to Holocene-age sandy colluvium. It consists of a yellowish brown fine sand with common rounded fragments of sandstone.

### **Cultural Materials**

Test Units 1, 3, and 5 were not very productive. Four (26.7 percent) of 15 levels excavated in these three units yielded a total of 2 small burned rocks and 9 flakes. In Test Unit 2, a peak in cultural materials occurred at 10–20 cm, including 40 flakes, 1 serrated arrow point tip, and 7 small burned rocks (0.25 kg). Only 1 burned rock and 2 flakes were found in Levels 1 and 3. From the surface to 40 cm, contiguous Test Units 4 and 6 yielded a total of 7 flakes, 1 core, and 16 burned rocks (3.25 kg). No cultural materials were found from 40–60 cm. Recovered artifacts associated with features are an Ensor

dart point (Feature 1) and a metate (Feature 4) (see Cultural Features).

### **Cultural Features**

Feature 1, a burned rock mound or midden, extends 20 m east-west by 7 m north-south and is fully exposed in tank trails. The feature is comprised of slabs and numerous angular and tabular pieces of limestone. Debitage was noted in association, and an Ensor dart point was surface collected. No intact portions were encountered in test units, and Feature 1 is largely destroyed.

Features 2 and 3 also are shallowly buried features exposed in tank trails. Feature 2, a burned rock concentration, measures 3 m east-west by 1 m north-south. It consists of small, angular pieces of limestone resting just above bedrock. Another burned rock concentration, Feature 3, measures 2 m east-west by 1 m north-south. Feature 3 is comprised of angular pieces of limestone and chunks of ironstone. Continuous vehicle traffic and further erosion have severely impacted both features.

Feature 4, a burned rock concentration, was contained in the west half of Test Unit 4 and the eastern portion of Test Unit 6. Encountered from 32–50 cm, the excavated portion of the feature measures 120 cm east-west by 100 cm north-south and sloped from south to north. The feature consisted of a single layer of burned rocks ( $n = 34$ , 27.5 kg). The rocks were primarily tabular and angular pieces of fossiliferous limestone; however, three fossiliferous limestone slabs (averaging 20x15x4 cm in size) and one sandstone cobble also were present. Most of the rocks were horizontally laid and exhibited very little imbrication and no apparent patterning. Some medium-sized roots and numerous rootlets were present throughout the matrix. In addition, decomposing bedrock was exposed across the southeast quadrant of Test Unit 4. One limestone metate was stained with hematite and probably functioned as a paint palette. Although not submitted for macrobotanical analysis, a processed flotation sample produced a low frequency of microdebitage and charred wood. Burned rocks visible in the east wall of Test Unit 4, the west wall of Test Unit 6, and the south walls of both excavation units indicated that Feature 4 may be quite large, but its overall dimensions cannot be estimated.

## Discussion

Although excavation results initially appeared promising in Test Units 2 and 4, Test Units 5 and 6 nearby failed to yield cultural deposits with a high degree of contextual integrity. Although one subsurface feature was encountered in Test Units 4 and 6, the lack of patterning in addition to the absence of organic remains suggests that the feature has limited research potential. The majority of Feature 1, a previously recorded burned rock mound, is heavily disturbed by a tank trail and subsequent erosion. Features 2 and 3 also are extensively disturbed by tank trails and erosion. Excavations in the vicinities of Features 1–3 did not encounter any cultural remains indicative of intact, buried features. Based on these results, 41CV1043 is recommended as not eligible for listing in the NRHP.

### 41CV1049

#### Site Setting

Site 41CV1049 is situated on a north-northeast-facing slope west of Cottonwood Creek and just south of an unnamed tributary. A major tank trail delineates the eastern site boundary and several other tank trails crisscross the site area (Figure 25). A few trails exhibit severe erosion and subsequent gullyng. Much of the site is open and covered with grasses; however, restricted areas support an oak-elm-juniper-mesquite woodland. Site elevation is 270 m above sea level.

#### Previous Work

On 22 May 1985, Dureka and Strychalski (Texas A&M University) recorded the site. It measured 270x140 m and consisted of burned rock scatters with associated chipped and ground stone artifacts. A burned rock mound was noted on the site form, but a burned rock concentration was the only feature plotted on the sketch map (near the southwest site boundary). Two Ensor points, one Darl point, and a piece of modified limestone were collected. Some of the cultural materials appeared to be redeposited by slopewash. An estimated 75 percent of the site was disturbed by erosion, vehicular traffic, and military activity.

On 9 December 1992, Mehalchick and Abbott (Mariah Associates) revisited the site. Based on the extent of exposed cultural materials, the maximum site dimensions were defined as 200x120 m. Located on a gently inclined slope of the Killeen surface, the site encompassed outcrops of the Paluxy sand and Glen Rose limestone. In addition, a relatively thick bed of limestone, overlain and underlain by thicker beds of fine sands, was present in the middle of the Paluxy outcrop. Based on geomorphic contexts and archeological potential, the site was divided into Subareas A and B.

Downslope from (north of) the Paluxy sands, Subarea B was underlain by an outcrop of upper Glen Rose limestone. This area was heavily eroded and lacked any in situ soil, but thin (less than 5 cm) slopewash sands were present in some areas. Sparse amounts of burned rocks were noted on the surface. Due to the negligible potential for intact cultural materials, no further work was recommended for Subarea B.

Comprising two-thirds of the site, Subarea A spanned the outcrop of Paluxy sands, including the interbedded limestone stratum. A relatively thin (less than 50 cm), strongly weathered soil developed on the Paluxy sand consisted of a 10–15-cm-thick, dark brown loamy fine sand (A horizon) that graded rapidly into a 25-cm-thick reddish brown, weakly structured clayey fine sand (Bt horizon). The solum, which contains cultural materials, was underlain by a thin, discontinuous, weakly laminar calcrete (K horizon) that rested on saprolitic bedrock containing large, soft concretions of calcium carbonate. In many areas, the soil was overlain by a 10–15-cm-thick mantle of brown, fine slopewash sands covering the cultural zone. In some places, vehicular traffic had caused severe localized sheet erosion that exposed some features. Midslope, the interbedded limestone cropped out as a low ledge devoid of soil but was largely mantled with the same slopewash drape.

Sparse to moderate amounts of lithic artifacts and mussel shells, in addition to a high density of burned rocks, were scattered across Subarea A. Five burned rock features were exposed in tank trails. Features 1 and 2 were burned rock middens measuring approximately 8x2 m and 7.0x5.5 m, respectively. Feature 3 consisted of a 3x2-m burned rock concentration with associated debitage. Feature 4, a possible hearth, measured 1.0x0.5 m. These four features were

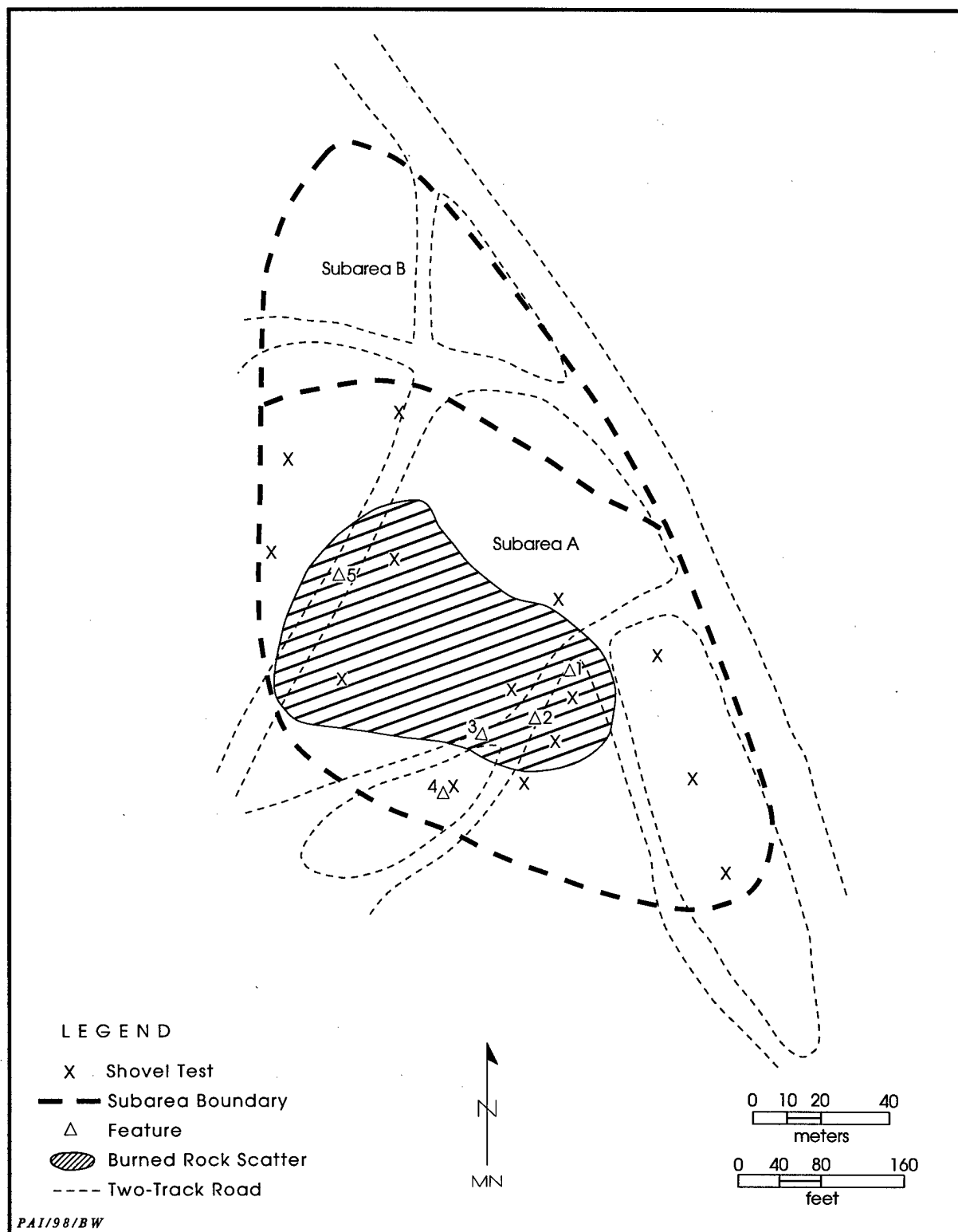


Figure 25. Site map, 41CV1049 (modified from Trierweiler, ed. 1994:A1199).

located within a 40 m radius near the south-central portion of the site. Feature 5, a burned rock concentration, measured 3x1 m and was exposed along a tank trail near the west-central portion of the subarea. Due to the potential for intact cultural deposits, shovel testing was recommended.

On 22 December 1992, a crew excavated 14 shovel tests in Subarea A. Eight (57.1 percent) of the tests contained cultural materials from 0–40 cm. Shovel tests adjacent to Features 1, 2, and 4 indicated that only Feature 1 might contain intact cultural deposits. At the south-central site margin, one shovel test yielded 4 burned rocks at 20–30 cm and 21 burned rocks at 30–40 cm. This subsurface concentration was designated Feature 6. In addition, one Pedernales point was surface collected. Based on the shovel testing results, Subarea A had the potential for intact cultural deposits of unknown significance that might be eligible for listing in the NRHP. The recommended testing effort was 2–4 m<sup>2</sup> of manually excavated test units (Trierweiler, ed. 1994:A1198–A1200).

### Work Performed

Prior to excavation, Subarea A of 41CV1049 was reinspected. Previously recorded burned rock Features 4 and 5 were re-located and found to be in the same condition as when first recorded. The locations of burned rock Features 1, 2, and 3 were found to be within a tank trail exposure where a large burned rock scatter (designated Feature 1) was observed, but only one concentration (designated Feature 1A) was observed. On 24 June 1996, Prewitt and Associates completed formal testing of Subarea A (Figure 26). Three backhoe trenches (Backhoe Trenches 1–3) and four 1x1-m test units (Test Units 1–4) were excavated. A total of 3.3 m<sup>3</sup> was manually excavated.

Centrally located in Subarea A, Backhoe Trench 1 was oriented to 327° and had maximum dimensions of 21.0x0.8x1.1 m. Sparse flakes and burned rocks were scattered throughout the upper 40 cm of deposits, with bedrock encountered at the base of the trench. About 40 m southwest of Backhoe Trench 1, Backhoe Trench 2 was excavated near the southwest margin of the subarea. It was oriented to 144° and measured 21.0x0.8x1.5 m. Bisected by the trench, a probable hearth exposed at 40–60 cm

in the east and west walls was designated Feature 7. Just beyond the southeast end of the trench, a scraper was surface collected. Backhoe Trench 3 (22.0x0.8x2.5 m) was excavated perpendicular to Backhoe Trench 2 a few meters southeast of Feature 7. No cultural materials were observed.

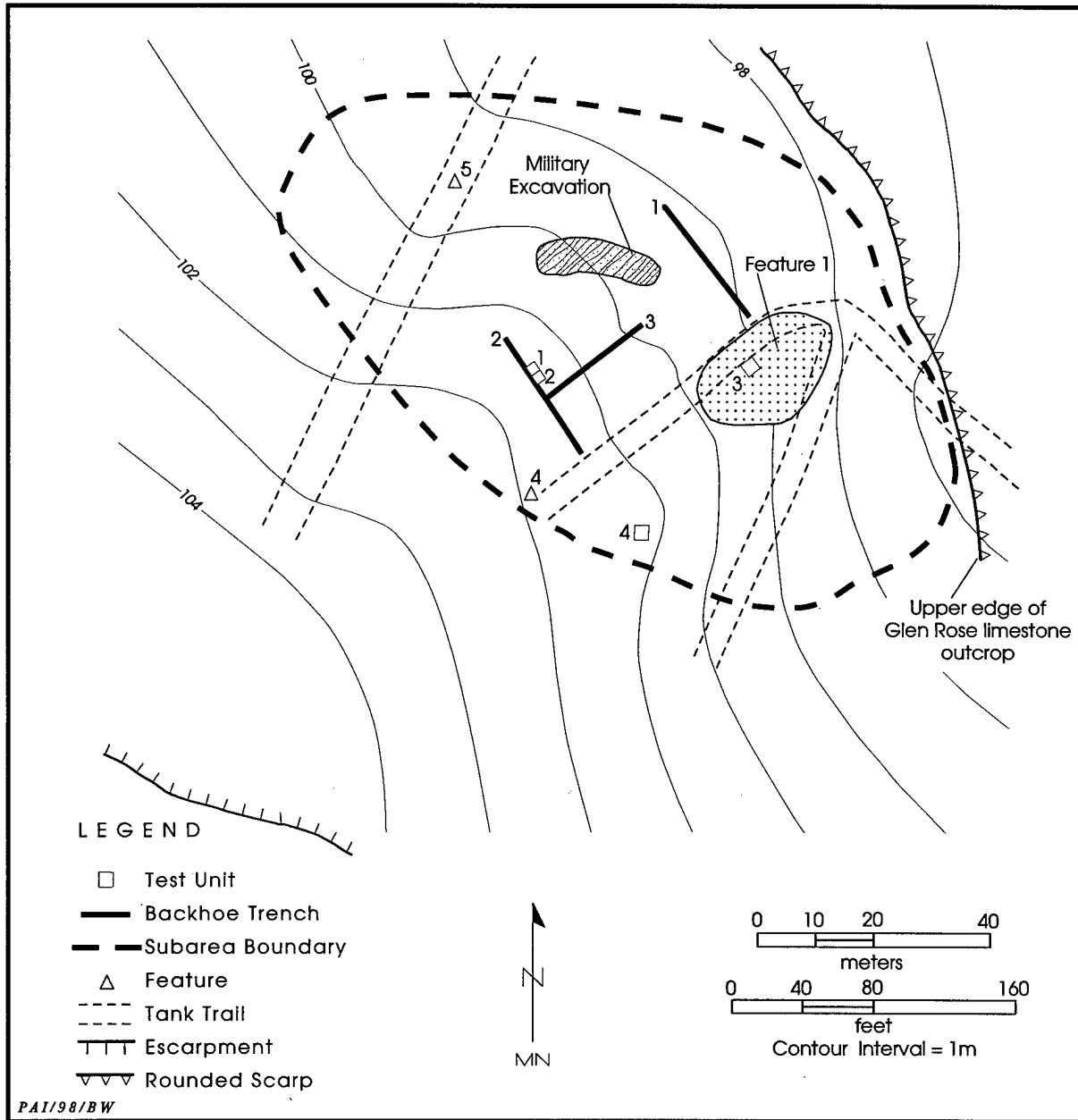
Placed along the east wall of Backhoe Trench 2, Test Units 1 and 2 are contiguous units situated over the exposed burned rock feature (Feature 7). Excavation of both units was terminated at 80 cm (2K horizon). Located in the vicinity of Feature 1 (a previously recorded burned rock midden), Test Unit 3 was excavated adjacent to a trail where a lens of burned rocks was exposed at 25–30 cm; the 2Bt horizon was encountered at 50 cm. Test Unit 4 was placed in the vicinity of Feature 6, a subsurface burned rock feature discovered during shovel testing. Its excavation was halted on a reddish yellow sandy matrix with carbonate filaments at 120 cm.

### Site Extent and Depth

The site is delimited by the Walnut Formation to the southwest and the Glen Rose limestone to the northeast. The Paluxy sediments continue an unknown distance southeast and northwest; however, based on the areal extent of exposed cultural materials and the testing results, Subarea A is estimated to cover 130 m northwest-southeast by 80 m northeast-southwest. The vertical extent of cultural deposits is represented by burned rock features at 15–32 cm and 30–64 cm and lithic debitage from 0–80 cm.

### Sediments and Stratigraphy

The profiles of Backhoe Trenches 1 and 2 reveal an intact Paluxy sandstone with an overlying mantle of weathered colluvium which thickens downslope (Figure 27). Intact friable Paluxy sandstone was observed from 72–161 cm in Backhoe Trench 2. It consists of a white fine-grained quartz sand with common thick laminae of caliche. Overlying the sandstone is a mantle of late Pleistocene- to late Holocene-age colluvium imprinted with an A-2Bt soil profile. The A horizon (0–22 cm) consists of dark grayish brown loamy fine sand of late Holocene age. The underlying 2Bt horizon (22–72 cm) is a truncated late Pleistocene/Holocene soil consisting of a yellowish brown sandy clay loam with



**Figure 26.** Map of Subarea A, 41CV1049.

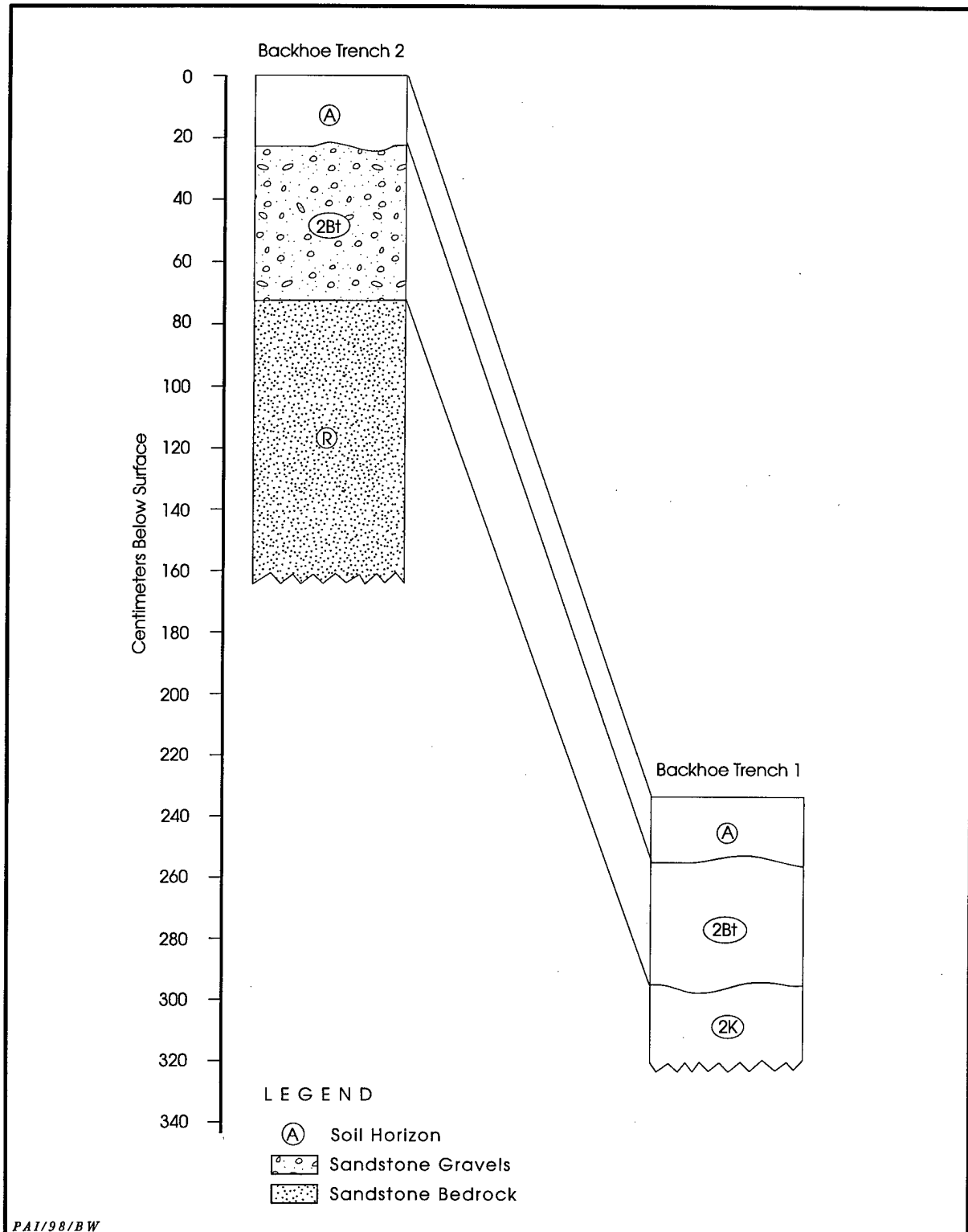
common rounded sandstone fragments.

Downslope, the late Quaternary colluvial mantle thickens slightly. The soil in Backhoe Trench 1 exhibits an A-2Bt-2K profile. The A horizon (0–21 cm) is a very dark gray loamy fine sand of late Holocene age. The underlying 2Bt horizon (21–61 cm) consists of a red to yellowish red clay loam to sandy clay loam overlying a 2K horizon of pale yellow to brownish yellow lami-

nated caliche with thin beds of yellowish red clay.

### Cultural Materials

Cultural materials were recovered from all four test units (Table 13). Similar types of cultural materials were found in contiguous Test Units 1 and 2, and their results are discussed together. From the surface to 80 cm, Test Units 1



**Figure 27.** Generalized site stratigraphy and profiles of Backhoe Trenches 1 and 2, 41CV1049.

Table 13. Summary of cultural materials from 41CV1049

Provenience	Arrow Point	Dart Points	Late-stage/ Finished Biface	Other Scraper	Spokeshave	Multifunctional Tool	Edge-modified Flakes	Cores	Unmodified Debitage	Unmodified Bone	Totals
<b>TEST UNIT 1</b>											
Level 1 (0–10 cm)	–	–	–	–	–	–	–	–	1	–	1
Level 2 (10–20 cm)	1	–	–	–	–	–	–	1	4	–	6
Level 3 (20–30 cm)	–	–	–	–	1	–	1	–	3	1	6
Level 4 (30–40 cm)	–	–	–	–	–	–	–	–	3	–	3
Level 5 (40–50 cm)	–	–	–	–	–	–	–	–	1	–	1
Level 6 (50–60 cm)	–	–	–	–	–	–	–	–	1	–	1
Level 7 (60–70 cm)	–	–	–	–	–	–	1	–	1	–	2
Level 8 (70–80 cm)	–	–	–	–	–	–	–	–	3	–	3
Subtotals	1	0	0	0	1	0	2	1	17	1	23
<b>TEST UNIT 2</b>											
Level 1 (0–10 cm)	–	–	–	–	–	–	–	–	1	–	1
Level 2 (10–20 cm)	–	–	–	–	–	–	–	–	1	–	1
Level 3 (20–30 cm)	–	–	–	–	–	–	–	–	3	–	3
Level 4 (30–40 cm)	–	–	–	–	–	–	–	–	3	–	3
Level 5 (40–50 cm)	–	–	–	–	–	–	–	–	1	–	1
Level 6 (50–60 cm)	–	–	–	–	–	–	–	–	2	–	2
Level 7 (60–70 cm)	–	–	–	–	–	–	–	–	2	–	2
Level 8 (70–80 cm)	–	–	–	–	–	–	–	–	–	–	0
Subtotals	0	0	0	0	0	0	0	0	13	0	13
<b>TEST UNITS 1 AND 2</b>											
Feature 7 (30–64 cm)	0	0	0	0	0	0	0	0	1	0	1
<b>TEST UNIT 3</b>											
Level 1 (0–10 cm)*	–	1	1	–	–	–	–	–	26	–	28
Level 2 (10–20 cm)	–	1	–	–	–	–	–	1	18	–	20
Level 3 (20–30 cm)	–	–	–	–	–	–	–	–	–	–	0
Level 4 (30–40 cm)	–	–	–	–	–	–	–	–	3	–	3
Level 5 (40–50 cm)	–	–	–	–	–	–	–	–	–	–	0
Feature 1A (15–32 cm)	–	–	–	–	–	1	–	–	18	–	19
Subtotals	0	2	1	0	0	1	0	1	65	0	70
<b>TEST UNIT 4</b>											
Level 8 (70–80 cm)	0	0	0	0	0	0	0	0	1	0	1
<b>GENERAL COLLECTION</b>											
Surface	0	0	0	1	0	0	0	0	0	0	1
Totals	1	2	1	1	1	1	2	2	97	1	109
*Includes recent intrusive items.											

and 2 produced a total of 688 burned rocks (61.75 kg), 30 flakes, 1 core, 2 edge-modified flakes, 1 spokeshave, and 1 vertebrate bone fragment. In addition, 1 Scallorn point was recovered from Test Unit 1 at 10–20 cm. Although most of the levels contained cultural materials,

about 86 percent of the items were found from 0–30 cm. Some of these cultural materials may be associated with Feature 7 (see Cultural Features) at 30–64 cm. At 30–34 cm, a single layer of angular burned rocks ( $n = 23$ , 15.5 kg) was confined primarily to the northeast quadrant of



Test Unit 1. Maximum excavated dimensions were 68 cm east-west and 42 cm north-south. These rocks appear to be associated with Feature 7 and most likely represent a "discard pile."

From 0–20 cm, Test Unit 3 yielded 90 small burned rocks (18 kg), 44 pieces of debitage, 1 late-stage/finished biface, 1 core, a reworked Pedernales point (0–10 cm), and a Darl point (10–20 cm). Intrusive pieces of barbed wire and rubber found in Level 1 indicate mixed deposits. Levels 3 and 4 (20–40 cm) produced 6 burned rocks (0.50 kg) and 3 flakes; Level 5 (40–50 cm) was culturally sterile. Of 12 levels excavated in Test Unit 4, only one flake was recovered at 70–80 cm.

### Cultural Features

Feature 1 is a burned rock scatter, ca. 25x17 m, exposed in tank trails. It subsumes the area where previously recorded Features 1, 2, and 3 were located. One concentration of burned rocks appeared to be a discrete lens, but it could not be correlated to any of the previously recorded burned rock features (i.e., the original Features 1–3). This lens of burned rocks, which was fully exposed from 15–32 cm across the northwestern two-thirds of Test Unit 3, turned out to be a discrete hearth. Although its maximum excavated dimensions are 100x100 cm, the south-southeast edge of this hearth forms a clearly delineated arc (Figure 28). Burned rocks visible in the west wall of Test Unit 3 indicate that the hearth extends an unknown distance to the west. Because a tank trail has obliterated the northern portion of the feature, its overall size cannot be accurately estimated. The feature consists of two burned rock layers ( $n = \text{ca. } 100$ , 79.5 kg), approximately 50 percent of which are large, flat slabs (20x10x5 cm), with a few cracked in situ. The remainder are fist-sized angular pieces. The majority were horizontally laid, but some of the slabs slope in various directions. The hearth did not exhibit a basin shape, and the angled rocks probably result from postdepo-



Figure 28. View to the south-southeast of Feature 1A in Test Unit 3, 41CV1049.

sitional disturbance rather than purposeful construction. The feature matrix consisted of a black, "greasy" sand with a high organic content. The feature matrix produced 18 flakes and 1 multifunctional tool (i.e., a graver and miscellaneous uniface). A charcoal sample collected at 28–32 cm yielded a radiocarbon age of  $1600 \pm 100$  B.P. (Beta-102097, see Appendix A). A flotation sample collected from 20–30 cm contained charred macrobotanical remains consisting of *Fraxinus*, *Quercus*, *Rosaceae*, and *Salicaceae* woods (see Appendix E).

Encountered from 30–64 cm in Test Units 1 and 2, Feature 7 consists of three layers of nonfossiliferous burned rocks ( $n = 136$ , 78.5 kg) and represents a basin-shaped hearth. Well-defined in plan view, its maximum excavated dimensions are 135 cm north-south by 50 cm east-west, with two-thirds of the hearth contained in Test Unit 2 (Figure 29). Based on exposures of burned rocks in the east and west walls of Backhoe Trench 2, the complete hearth is estimated to be 1.8 m in diameter. Approximately 50 percent of the burned rocks are large, tabular pieces and slabs up to 20x20x10 cm in size. The remainder are fist-sized and smaller angular rocks. The larger rocks are located primarily along the perimeter, with four vertical rocks delimiting the southeast edge of the hearth. The burned rocks generally slope from east to west



**Figure 29.** View to the northeast of Feature 7 in Test Units 1 and 2, 41CV1049.

toward the center of the feature. This dip is also evident in the trench wall opposite the test units where the hearth has a maximum depth of 75 cm below ground surface. Some rocks were cracked in situ, and no evidence of disturbance was apparent. The feature fill contained one flake. Charcoal collected from 45–51 cm was identified as *Quercus* wood and yielded a radiocarbon age of  $1590 \pm 50$  B.P. (Beta-102096, see Appendixes A and E). Also collected from 45–51 cm, a flotation sample contained charred macrobotanical remains of *Celtis*, *Juglans*, *Quercus*, and *Salicaceae* woods (see Appendix E). Four additional processed flotation samples contained low frequencies of microdebitage and charred wood.

### Discussion

The testing results demonstrate that Subarea A at 41CV1049 contains spatially discrete features buried within late Holocene colluvial sediments derived from the Paluxy sand. Utilization of the area toward the end of the Late Archaic period is indicated by calibrated charcoal radiocarbon dates of A.D. 420–550 and A.D. 380–590 (see Appendix A) and an associated Darl point. A Scallorn point and associated cultural materials recovered from the upper portion of the cultural zone (i.e., at 0–20 cm above Feature 7) indicate that occupations extended into the Late

Prehistoric period. However, no stratigraphically discrete component or features can be attributed to these later occupations at this time.

Charred wood identified as oak, hackberry, walnut, ash, and willow and rose families was recovered from two hearths. These remains constitute a wide range of flora never before recovered from an individual Paluxy site at Fort Hood. Although these six taxa represent woods utilized as fuel, they also indicate potential food resources. The preservation of perishable remains and the diversity of the artifact assemblage associated with intact features/components renders this site significant; thus, 41CV1049 is recommended as eligible for listing in the NRHP.

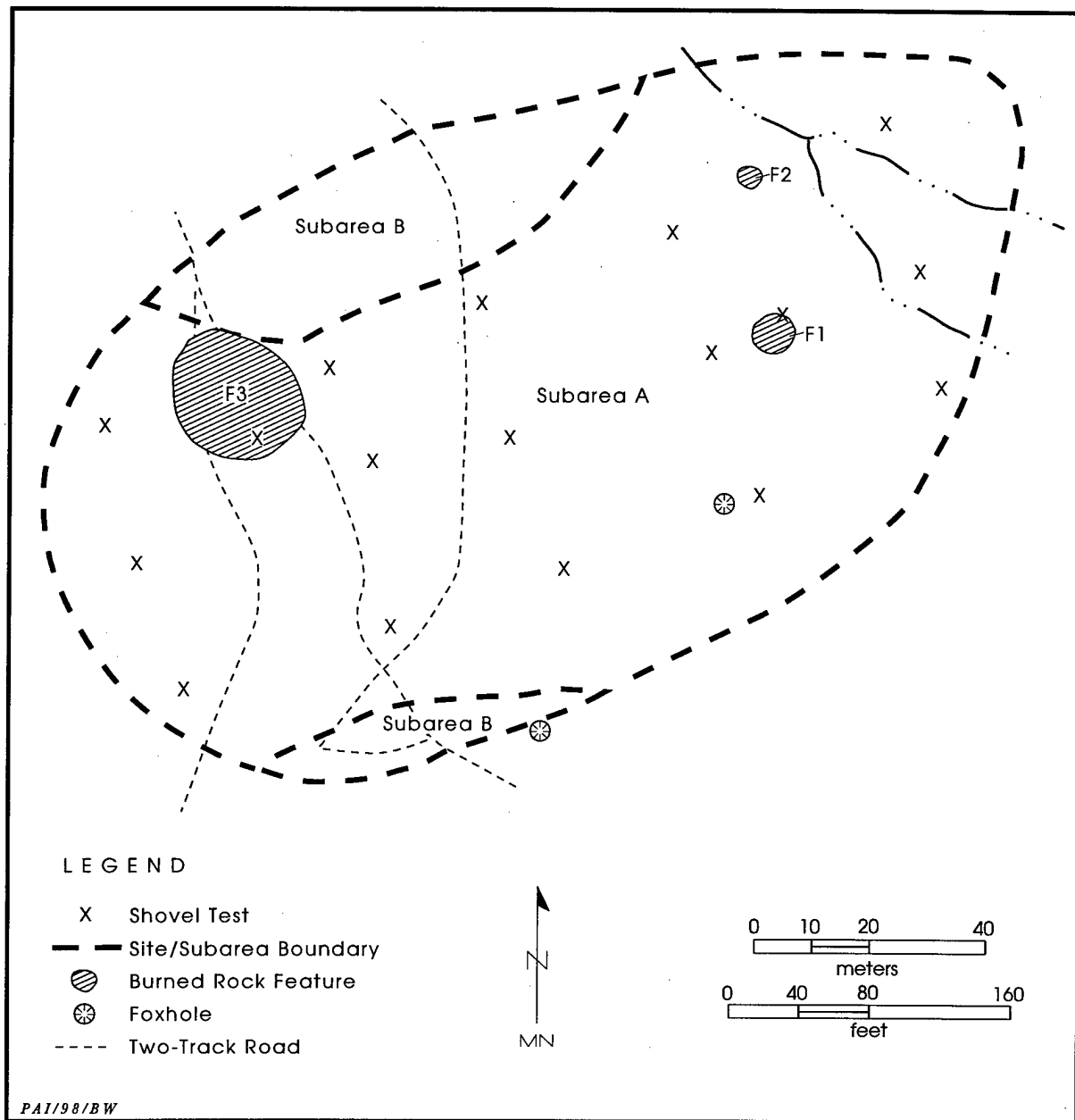
### 41CV1050

#### Site Setting

Site 41CV1050 is situated on a gentle, south-facing upland slope. The site is covered by clusters of juniper and oak trees that are separated by open grassy areas. Although a frequently traveled two-track road bisects the western end of the site (Figure 30), the presence of military vehicular traffic throughout most of the open areas of the site is evident. Site elevation is 270 m above mean sea level.

#### Previous Work

The site was recorded by Mesrobian, Masson, and Drollinger (Texas A&M University) on 23 March 1985 as containing burned rock concentrations with associated lithic scatters. Site dimensions were defined as 190 m east-west by 110 m north-south. Three dart points were collected and burned rocks, debitage, and bifaces were observed on exposures. The site was noted as being buried within colluvial sands and silts estimated as 50–100 cm thick. Although tracked vehicle and erosional disturbances were observed, the site was estimated to be only 30 percent disturbed.



**Figure 30.** Site map, 41CV1050 (modified from Trierweiler, ed. 1994:A1202).

On 23 September 1992 Abbott and Kleinbach (Mariah Associates) reassessed the site based on geomorphic observations and the potential for intact cultural deposits. Site size was reduced to 160 m east-west by 80 m north-south, and it was divided into Subareas A and B on the basis of underlying lithology. Subarea B included small segments on the upslope and downslope margins of the site which were noted to be underlain by

limestone and mantled with a relatively thin, discontinuous clay loam A horizon. A few flakes and burned rocks were observed in Subarea B, but no further work was recommended.

Subarea A encompassed an outcrop of Paluxy sandstone where a truncated, strongly developed, sandy soil (consisting of a highly rubified B21ts-B22t-Cox horizon sequence) was observed to underlie an accumulation (up to

50 cm thick) of slopewash sediments. Three surface burned rock features (Features 1–3) were identified in this subarea. Feature 1 (8x6 m) was noted to be partially buried in the Paluxy sand in the east-central portion of Subarea A. Feature 2 (4.0x1.5 m), located at the northeast margin of the subarea, was observed to be highly disturbed as a result of exposure by a gully. Feature 3 (16x10 m) was located in two roadcuts in the west end of the site. A moderate amount of lithic debitage was observed in Subarea A, mainly in the vicinity of Feature 3, where an Ensor dart point and a drill base were surface collected. Although sheet erosion and tracked vehicle disturbances were observed, most of the site appeared to be in relatively good condition.

A crew returned and excavated 17 shovel tests within Subarea A. Six (35.3 percent) of these tests produced cultural materials from 0–20 cm. Sixteen flakes and a biface were recovered from five of these shovel tests. The remaining positive test, from which 8 burned rocks were recovered at 10–20 cm, was placed adjacent to Feature 1. Shovel test results indicated that buried cultural materials were present and that in situ archeological deposits of unknown significance were likely, especially upslope of Feature 1. A minimum testing effort of 3–4 m<sup>2</sup> of manually excavated test pits was recommended to determine the NRHP eligibility of Subarea A (Trierweiler, ed. 1994:A1201–A1203).

### **Work Performed**

In June 1996, Prewitt and Associates completed formal testing of Subarea A of 41CV1050. All three previously recorded features were re-located. Three backhoe trenches and four 1x1-m test units were excavated (Figure 31). A total of 1.5 m<sup>3</sup> was manually excavated.

Backhoe Trenches 1–3 were oriented to 292°, 238°, and 258° magnetic north, respectively. Each was excavated to bedrock. Backhoe Trench 1 (15.0x0.8x0.9 m) was excavated near the western site boundary; Backhoe Trench 2 (5.0x0.8x0.7 m) was placed near the upslope edge of Feature 1 in the east-central portion of the site. Backhoe Trench 3 (5.0x0.8x0.6 m) was placed between these two trenches, ca. 25 m upslope of Backhoe Trench 2. No cultural materials were observed in the trench profiles, with the exception of a few scattered burned rocks observed at 25–35 cm in Backhoe Trench 3. The profiles of Backhoe

Trenches 1 and 2 were described and soil geomorphology was assessed.

All of the test units were oriented to magnetic north. Test Units 1, 3, and 4 were excavated to bedrock at 30, 50, and 30 cm below the surface, respectively. Test Unit 2 was excavated to Pleistocene-age sediments at 40 cm. Test Units 1 and 2 were placed near Features 1 and 3, respectively. Test Unit 3 was excavated in the upslope portion of Subarea A. Test Unit 4 was excavated farther upslope to define the upper boundary between Subareas A and B.

### **Site Extent and Depth**

Current investigations were concentrated in Subarea A of 41CV1050, which comprises the majority of the site and covers an area of ca. 150 m northeast-southwest by 70 m northwest-southeast. Cultural materials were recovered from 10–30 cm in Test Unit 1 and from 0–30 cm in Test Units 2 and 3. Test Unit 4, located in Subarea B approximately 20 m north of Subarea A, was culturally sterile.

### **Sediments and Stratigraphy**

Site 41CV1050 consists of a thin mantle of late Holocene-age sandy colluvium overlying a well-developed but truncated soil formed on late Pleistocene- to Holocene-age colluvium (see Appendix B). The 86-cm-thick profile of Backhoe Trench 1 reveals an A-2Bt-2BC-2K soil imprinted on these sediments. The A horizon/late Holocene mantle is 22 cm thick and consists of a dark grayish brown loamy sand. The truncated 2Bt-2BC soil (22–68 cm) is a reddish brown grading to yellowish red sandy clay loam. An A-2Bt-2BC-3BC-3K soil was observed in the 51-cm-thick profile of Backhoe Trench 2. The A horizon is a very dark grayish brown fine sandy loam. The underlying truncated soil is a reddish brown to brown fine sandy clay loam (2Bt-2BC horizons). A second truncated soil, a brown clay loam (3BC horizon), underlies the 2Bt-2BC horizons. Both truncated soils have a coarse angular blocky structure and are underlain by a late Pleistocene-age caliche.

### **Cultural Materials**

Low frequencies of cultural materials were recovered, including 2 flakes from Test Unit 1;

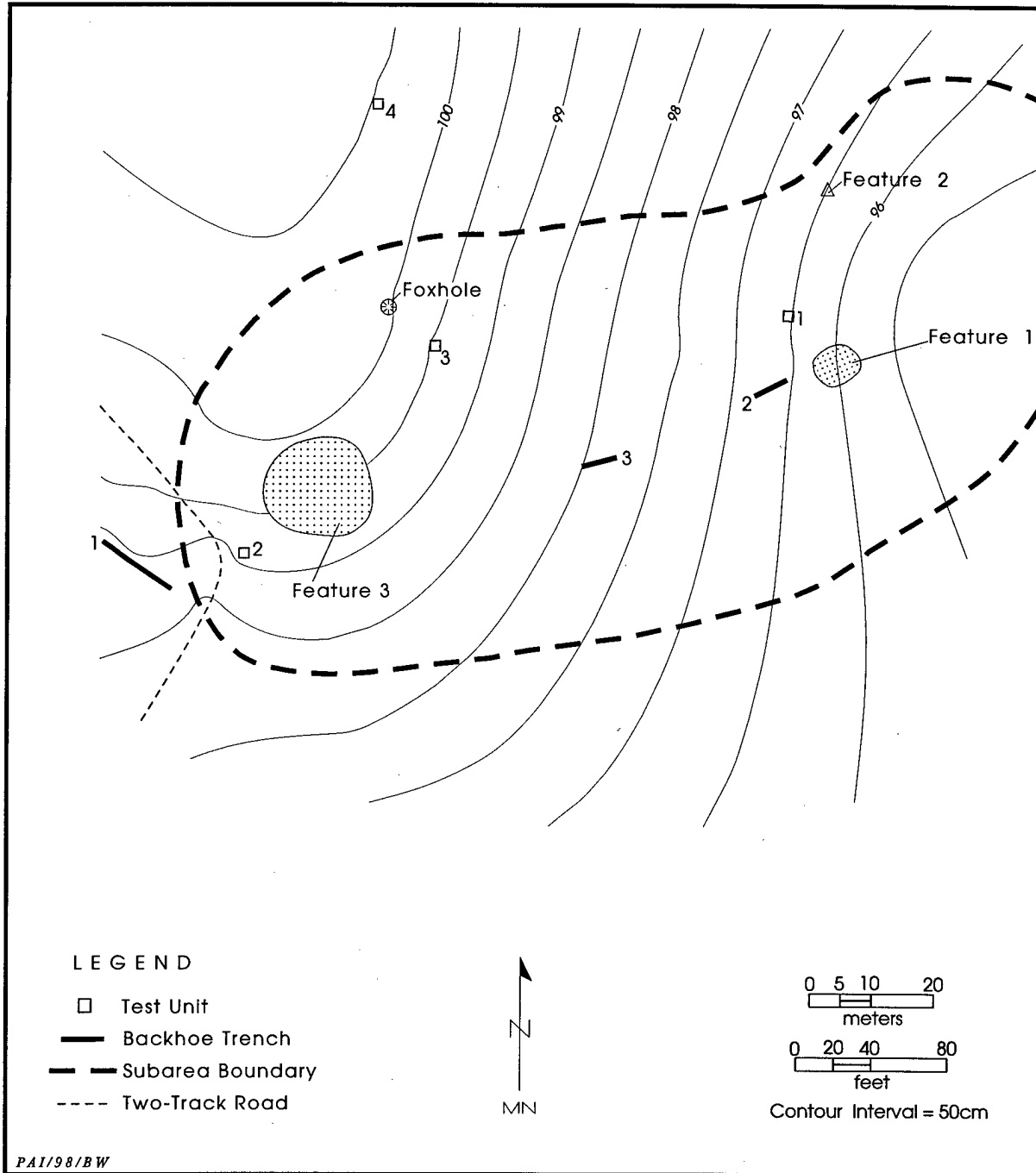


Figure 31. Map of Subarea A, 41CV1050.

25 flakes, 1 edge-modified flake, 1 other scraper, and 13 burned rocks from Test Unit 2; and 22 burned rocks from Test Unit 3. Diagnostic artifacts are a reworked Darl point recovered from 10–20 cm in Test Unit 2 and a Godley point surface collected from Feature 3. No subsistence remains

or dateable organic materials were recovered.

### Cultural Features

The three burned rock concentrations (Features 1–3) identified during the previous

investigation were re-located and examined. Feature 2 was not tested because it was completely eroded and redeposited into the bed of a small gully. Features 1 and 3 were tested by Test Units 1 and 2, respectively. Although low frequencies of cultural materials were found in each of these units, these features are largely surficial.

### **Discussion**

The collection of an Ensor point during the previous investigation and a Darl and Godley during the present study suggest that the site was occupied during the Late Archaic period. Small amounts of debitage and burned rocks were recovered during the present investigation. All of the cultural materials were recovered from the unconsolidated sand matrix and were fairly evenly distributed in the upper 30 cm of the deposits. Testing results indicate that the three burned rock concentrations (Features 1-3) are primarily surface manifestations; these features, along with the unconsolidated sediments contained within Subarea A, have an extremely limited potential for containing organic remains or isolable evidence of discrete occupations. It is recommended that 41CV1050 be considered ineligible for listing in the NRHP.

### **41CV1093**

#### **Site Setting**

Site 41CV1093 is located on a gentle south-facing slope west of an unnamed tributary of Cowhouse Creek (Figure 32). One main and numerous smaller tank trails bisect the site area and several exhibit severe gullying. Most of the site is open and covered with grasses, but isolated stands of cedar elm, post oak, and juniper trees are present. Site elevation is 270 m above mean sea level.

#### **Previous Work**

On 12 July 1985, Masson (Texas A&M University) recorded the site as an extensive campsite (170x115 m) containing multiple dense burned rock scatters and concentrations with associated lithic artifacts. Numerous burned rocks were exposed in a north-south tank trail, but much of the site was thought to be between

the tank trail and a tributary along the eastern site boundary. An untyped dart point and a Darl point were collected. An estimated 55 percent of the site was disturbed by tracked vehicles, erosion, and bivouac activity.

On 4 November 1992, Turpin and Frederick (Mariah Associates) revisited the site. Based on the areal extent of exposed cultural materials, site dimensions were reduced to 140x90 m. The site was situated on a gentle south-facing slope comprised of Paluxy sand and colluvial sediment overlying Glen Rose limestone. The slope was rectilinear in profile and adjacent to a first-order stream valley which had a single constructive geomorphic surface representing the active floodplain. A few exposures revealed an A-E-Bt-R soil profile. The A and E horizons were loamy sand and differed in color, with the A horizon being dark brown and the E horizon pale brown or white. The argillic horizon was a strong brown red sandy clay, possibly in excess of 1 m thick, exhibiting a coarse, blocky structure. Light to moderate amounts of lithic artifacts were noted among moderate to dense accumulations of burned rocks. Seven features were identified in and adjacent to roadcuts. Features 1, 2, 3, 5, and 7 were identified as burned rock concentrations ranging from ca. 0.25 m to 17 m in maximum length. Measuring 6 m in diameter, Feature 4 appeared to be a burned rock concentration or mound, although it was unclear whether the "mounded" morphology was cultural or merely a coincidental topographic occurrence. Approximately 10 m west of Feature 4, Feature 6 was a cluster of burned rock concentrations or mounds within a 20 m area. The cultural materials appeared to be buried within the A and possibly E horizons. One Ensor point was surface collected. Since the site had potential to contain buried cultural deposits, shovel testing was recommended.

On 8 December 1992, a crew excavated 14 shovel tests, of which 8 (57 percent) yielded burned rocks and/or debitage from the surface to a maximum depth of 45 cm. The greatest densities of cultural materials were typically found in shovel tests adjacent to features. The shovel testing results suggested that intact cultural deposits of unknown significance were present and possibly eligible for listing in the NRHP. Recommended testing included at least 3-6 m<sup>2</sup> of manually excavated test units (Trierweiler, ed. 1994:A1219-A1222).

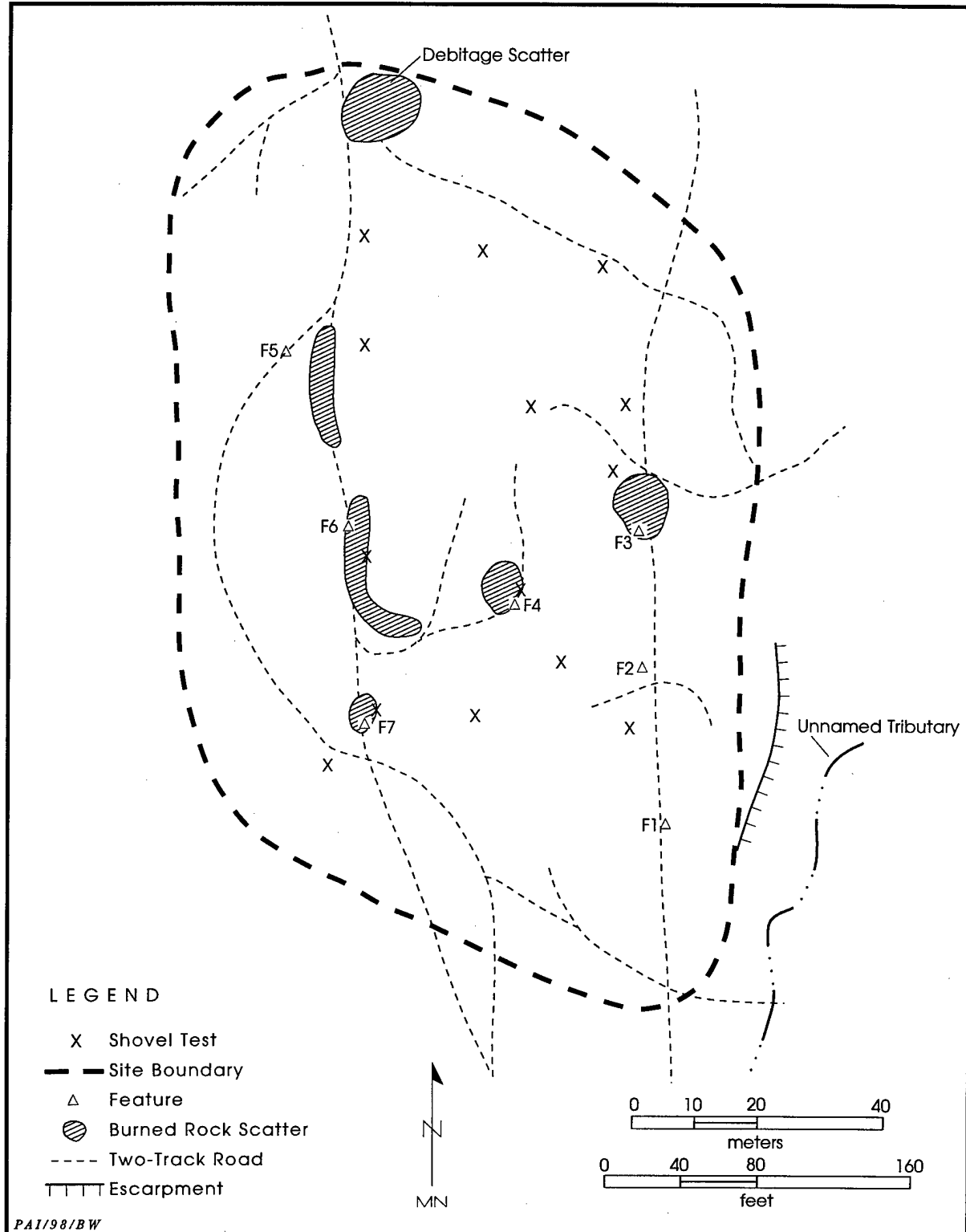


Figure 32. Site map, 41CV1093 (modified from Trierweiler, ed. 1994:A1220).

## **Work Performed**

Prior to excavation, the site was resurveyed. All seven previously recorded burned rock features were re-located, but the large burned rock scatters were not evident since burned rocks were scattered across the entire site. On 19 July 1996, Prewitt and Associates completed formal testing of 41CV1093 (Figure 33). The test excavations include one backhoe trench and five 1x1-m test units (Test Units 1–5). A total of 2.5 m<sup>3</sup> was manually excavated.

Backhoe Trench 1 was excavated near the northwestern site margin. Oriented to 345°, the trench had dimensions of 17.0x0.8x0.9 m. No cultural materials were found.

At the center of the site, Test Unit 1 was placed in a vegetated area just north (upslope) of an exposed portion of Feature 4, the “mounded area” noted by previous investigators. The excavation encountered weathered bedrock at 41–51 cm. About 25 m northwest of Test Unit 1, Test Unit 2 was placed approximately 4 m east of a tank trail and 10–12 m northeast of Feature 6. The excavation was terminated at dense gravels and weathered limestone at 30 cm. Test Unit 3 was placed 2 m east of Feature 6, southwest of Test Unit 2, and west (downslope) of Test Unit 1. This unit encountered weathered limestone at 70 cm. Located west of a tank trail and ca. 8 m east (downslope) of Test Unit 1, Test Unit 4 was excavated to dense gravels at 50 cm. Encountering bedrock at 50 cm, Test Unit 5 was excavated approximately 18 m northwest of Test Unit 2 and 10 m northeast of Feature 5.

## **Site Extent and Depth**

The slope encompassing the Paluxy sands is delimited on three sides. Along the eastern boundary, a gentle scarp defines the edge of the slope. Below the scarp, a 20–25-m-wide active floodplain (T<sub>0</sub>) extends to the tributary. The sandy deposits thin to the north and south, and exposed bedrock becomes visible. The Paluxy sand-covered slope continues an unknown distance to the west; however, based on exposures of cultural materials and the excavation results, the site size (140x90 m) remains unchanged from when it was originally defined in 1992. Cultural materials were encountered from 0–70 cm.

## **Sediments and Stratigraphy**

Site stratigraphy was described in the profile of Backhoe Trench 1 (see Appendix B). The 61-cm-thick profile consists of late Pleistocene and late Holocene colluvial units overlying Glen Rose limestone. These units are pedogenically altered to various degrees. The A horizon (0–32 cm) is a dark brown loamy fine sand of late Holocene age. It overlies a truncated dark reddish brown clay loam 2Bt horizon formed on late Pleistocene/Holocene sediments.

## **Cultural Materials**

All of the test excavations except Test Unit 2 produced cultural materials (Table 14). These consisted of a high frequency of burned rocks (n = 165, 26.5 kg), 242 flakes, 7 chipped lithic tools, a ground stone fragment, and a piece of ground and striated hematite. An untypeable dart point fragment was recovered from Test Unit 3 (10–20 cm). A Castroville point recycled into a burin also was recovered from this unit (30–40 cm). Both artifacts are probably associated with Feature 6. A modified hematite piece found in Test Unit 4 at 20–30 cm is associated with Feature 8 (see Cultural Features).

## **Cultural Features**

Feature 4 was present in Test Unit 1 from 12–51 cm. When first encountered, numerous burned rocks were exposed and left in situ. A plan view was drawn and a flotation sample was collected from the first burned rock layer. Upon removing these burned rocks, the same procedure was followed for each successive rock layer. In this manner, the excavators were able to maintain consistency, increase the possibility of finding a discrete internal feature, and obtain data to facilitate feature interpretation after excavation. The only exception to these procedures occurred with the lowermost rock layer, where two flotation samples were collected.

At 12–28 cm, the first layer of Feature 4 consisted of 43 burned pieces of limestone (27.5 kg), of which half were fossiliferous. Approximately 80 percent of the rocks were fist-sized and larger angular pieces, 5 percent were slabs (up to 20x15x3 cm), and the remaining pieces were tabular. The overwhelming majority were laid horizontally. A small area (ca. 40x25 cm) at the



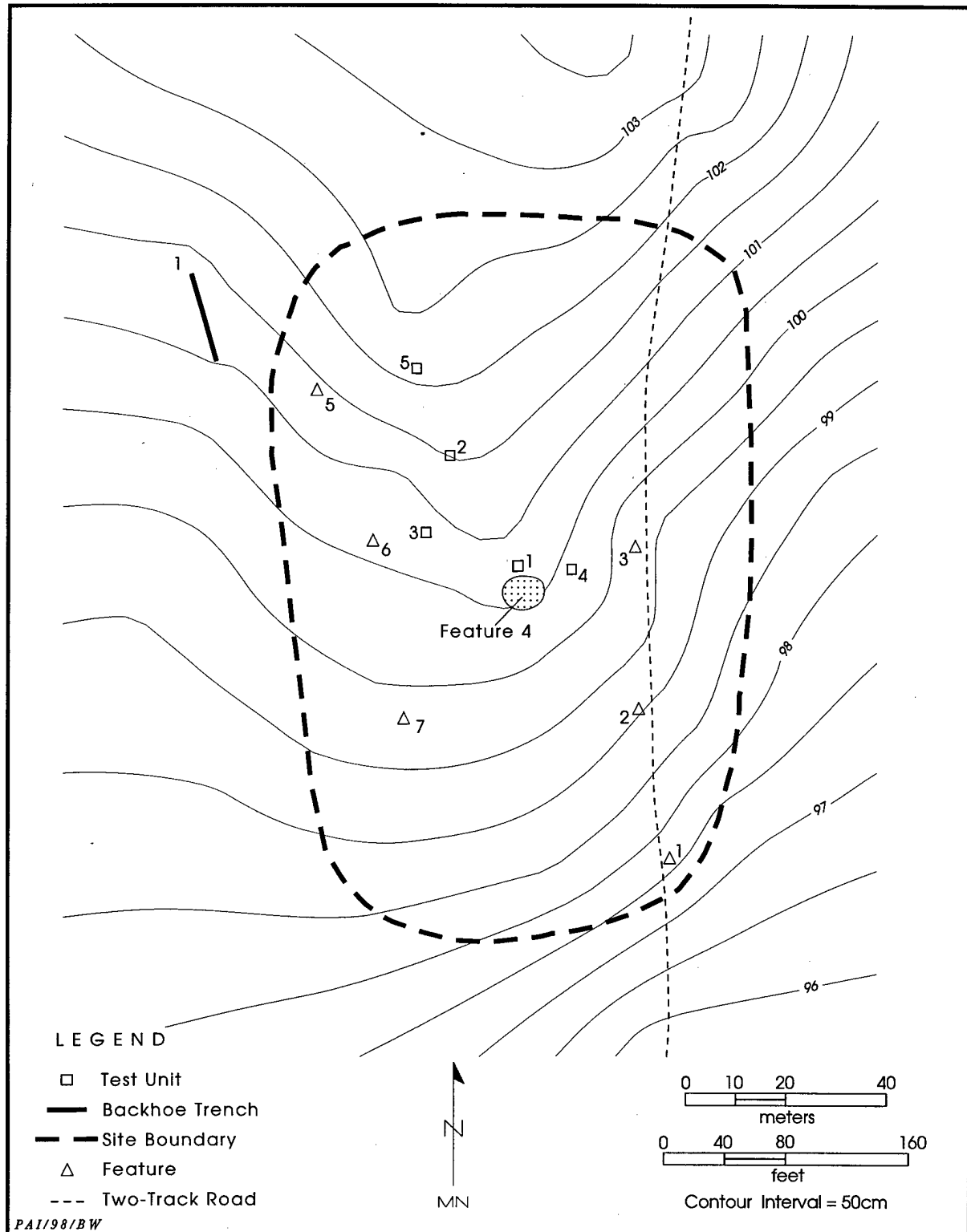


Figure 33. Map showing test units at 41CV1093.

Table 14. Summary of cultural materials from 41CV1093

Provenience	Dart Point	Late-stage/ Finished Bifaces	Miscellaneous Uniface	Gravers/Burins	Core Tool	Edge-modified Flake	Unmodified Debitage	Ground Stone Tool	Modified Hematite	Totals
<b>TEST UNIT 1</b>										
Level 1 (0–10 cm)	–	–	–	–	–	–	1	–	–	1
Level 2 (10–20 cm)	–	–	–	–	–	–	13	–	–	13
Level 3 (20–30 cm)	–	–	–	–	–	–	9	–	–	9
Feature 4 (12–51 cm)	–	–	1	–	–	–	53	–	–	54
Subtotals	0	0	1	0	0	0	76	0	0	77
<b>TEST UNIT 3</b>										
Level 1 (0–10 cm)	–	–	–	–	–	–	–	–	–	0
Level 2 (10–20 cm)	1	–	–	–	–	–	7	–	–	8
Level 3 (20–30 cm)	–	–	–	–	–	–	3	–	–	3
Level 4 (30–40 cm)	–	–	–	1	–	–	2	–	–	3
Level 5 (40–50 cm)	–	–	–	–	–	–	7	–	–	7
Level 6 (50–60 cm)	–	1	–	–	–	–	7	–	–	8
Level 7 (60–70 cm)	–	–	–	–	–	–	1	–	–	1
Feature 6 (25–35 cm)	–	–	–	–	–	–	5	1	–	6
Subtotals	1	1	0	1	0	0	32	1	0	36
<b>TEST UNIT 4</b>										
Level 1 (0–10 cm)	–	–	–	–	–	–	1	–	–	1
Level 2 (10–20 cm)	–	1	–	–	–	–	64	–	–	65
Level 3 (20–30 cm)	–	–	–	–	–	–	9	–	1	10
Feature 8 (24–42 cm)	–	–	–	–	–	–	7	–	–	7
Subtotals	0	1	0	0	0	0	81	0	1	83
<b>TEST UNIT 5</b>										
Level 1 (0–10 cm)	–	–	–	–	–	–	–	–	–	0
Level 2 (10–20 cm)	–	–	–	–	1	–	42	–	–	43
Level 3 (20–30 cm)	–	–	–	–	–	–	7	–	–	7
Level 4 (30–40 cm)	–	–	–	–	–	1	4	–	–	5
Level 5 (40–50 cm)	–	–	–	–	–	–	–	–	–	0
Subtotals	0	0	0	0	1	1	53	0	0	55
Totals	1	2	1	2	1	1	242	1	1	251

southeast corner of the test unit was devoid of burned rocks.

The second layer was comprised of 125 burned rocks (48 kg) from 28–38 cm. At 30 cm, Feature 4 extended across the entire test unit. Excluding two pieces of sandstone (2 kg), all of the burned rocks were limestone, with 40 percent being fossiliferous. Most were fist-sized and larger angular pieces, and almost half of these

were extremely blocky (i.e., 5–10 cm thick). Most were horizontally laid, but four in the northwest quadrant of the unit were vertical. These did not appear to signify an internal feature.

Encountered at 38–44 cm, the third burned rock layer consisted of 101 pieces of limestone (49.5 kg) and 3 sandstone rocks (2.5 kg). These burned rocks were similar in size and composition to the preceding layer, but included tabular

pieces (20 percent) that averaged 15x10x5 cm in size. The majority of the rocks were horizontally laid; however, some were dangled in various directions.

At 44–51 cm, the lowest burned rock layer contained 152 pieces of limestone (53.5 kg); 20 percent were fossiliferous. The rock types and construction were similar to those of the previous two layers, with about 10 percent being tabular pieces (averaging 12x12x4 cm). The feature rested on weathered limestone bedrock which sloped gently from south to north. In addition, a shallow natural depression (50 cm long and 12–14 cm deep) occurs in the bedrock at the northern end of the unit's west wall. Burned rocks are visible in all four walls of the test unit, indicating that the feature extends beyond the limits of the excavation in all directions.

In summary, the excavated portion of Feature 4 consists of a thick mass of burned rocks ( $n = 424$ , 181 kg) from 12–51 cm in Test Unit 1. Although they were excavated in four layers, there was no definable patterning to the placement of the burned rocks. The feature is interpreted as part of a domed, subsurface burned rock mound, similar to Feature 2 at 41CV984. About 98 percent of the burned rocks are limestone, and approximately half of these are fossiliferous and tend to be bright red from heating. The remaining two percent are sandstone. Generally, the burned rocks are fist-sized and larger angular fragments, with larger, blocky pieces more prevalent in the lower layers. Approximately 30 percent of the rocks were cracked in situ. The feature matrix was almost black due to its high organic content. Small and medium-sized roots were present throughout, but the level of bioturbation appears minimal.

In addition to burned rocks, Feature 4 yielded one miscellaneous uniface and a total of 53 flakes. The debitage counts are evenly distributed in all rock layers except the fourth (lowest) layer, which produced only five flakes. Few *Rabdotus* shells were present from 12–43 cm, and 13 shells were present at 43–49 cm. Charcoal from 43–49 cm yielded a radiocarbon age of  $1420 \pm 40$  B.P. (Beta-102098, see Appendix A). A flotation sample collected at 43–47 cm contained charred macrobotanical remains of *Fraxinus*, *Quercus*, *Rosaceae*, and indeterminate woods, in addition to indeterminate thick nutshell fragments (see Appendix E). Although not submitted for macrobotanical analysis, four additional

flotation samples contained low frequencies of microdebitage and/or charred wood.

Feature 4 rests on weathered bedrock that slopes from south to north. A shallow bedrock depression observed in the west wall of Test Unit 1 appears to be the edge of a natural basin that probably extends to the west. Although no discrete internal feature (e.g., hearth) was encountered, the natural depression in the bedrock may have been incorporated into the construction of a central hearth/earth oven. Similar use of natural depressions has been documented in some other burned rock mounds at Fort Hood (Abbott and Trierweiler, eds. 1995a:774).

Feature 6, a burned rock concentration, was encountered at 25–35 cm in Test Unit 3. It consists primarily of a single layer of horizontally laid burned rocks, but some rocks exhibit imbrication. The burned rocks ( $n = 73$ , 22.25 kg) consist of limestone (90 percent) and sandstone (10 percent) and range in size from 3x3x2 cm to 16x13x6 cm. Approximately 85 percent are fist sized and angular, but most of the larger rocks are tabular pieces. Maximum excavated dimensions are 100 cm north-south and 100 cm east-west, but the southeastern quadrant of the test unit was nearly devoid of burned rocks. Burned rocks visible in the north and west walls of the test unit indicate that the feature extends an unknown distance in these directions, although the area 2 m to the west is severely impacted by tracked vehicles. The feature fill yielded five flakes and one indeterminate ground stone fragment (fossiliferous limestone). One flotation sample contained an extremely low frequency of charred wood.

At 24–42 cm in Test Unit 4, Feature 8 extended across the entire unit. This burned rock concentration consists of one to two layers of fist-sized and larger, horizontally laid burned rocks. Approximately 75 percent of the burned limestone rocks ( $n = 62$ , 55 kg) were blocky and angular, while the remaining pieces were tabular. Burned rocks visible in all four walls of the unit indicate that the feature continues an unknown distance in all directions. Seven flakes were recovered from the feature fill, and a flotation sample produced sparse amounts of microdebitage.

## Discussion

A calibrated charcoal radiocarbon date of A.D. 620–660 (see Appendix A) near the base of

Feature 4 and a Castroville point associated with Feature 6 indicate utilization of the area during the latter half of the Late Archaic period. The fact that Feature 4 occurs subsurface and is protected within a "vegetated island" suggests that the mound has been minimally impacted by the military activities that have disturbed an extensive portion of the site. The excavations and surrounding topography suggest that Feature 4 is intact and spatially discrete. Although the horizontal extent of the feature is not known, burned rocks were exposed in tank trails located ca. 3.5 m southeast, south, and southwest of Test Unit 1. No burned rocks were exposed in a tank trail rut 4.5 m southeast of Test Unit 1. This exposure revealed 30 cm of matrix underlain by weathered limestone. Based on these exposures, Feature 4 extends at least 4 m north-south.

The location of Test Unit 1 and the 40-cm-thick portion of the buried mound is coincident with the highest topographic rise in the immediate area. Although not conclusively demonstrated during the test excavations, the 22-cm-thick Feature 6 (ca. 15 m west of Test Unit 1) and the 10-cm-thick Feature 8 (5–6 m east of Test Unit 1) may represent the thinner downslope margins of Feature 4 (such as seen with Feature 2 at 41CV984). If Features 6 and 8 represent part of Feature 4 rather than separate features, this burned rock mound could extend as much as 20 m east-west.

Charred wood of oak, ash, and the rose family and thick nutshell fragments (possibly walnut) recovered at the base of Feature 4 are indicative of fuel and food resources. A ground stone from Feature 6 also suggests food gathering and processing activities. Associated with Feature 8, a modified hematite fragment may have been used for ornamentation.

The testing results demonstrate that site 41CV1093 contains discrete subsurface features with preserved organic remains and an associated assemblage indicative of a variety of activities. Based on the foregoing, this site is considered significant and recommended as eligible for listing in the NRHP.

#### **41CV1106**

##### **Site Setting**

Site 41CV1106 is situated a few kilometers north of Cowhouse Creek and ca. 250 m west of

an unnamed tributary. Located on a east-facing slope, the site is crisscrossed by one main and numerous smaller tank trails. The vegetation consists of dense stands of post oak, cedar elm, live oak, and juniper with a thick understory growth. Site elevation is 270 m above mean sea level.

##### **Previous Work**

On 22 July 1985, Masson and Dureka (Texas A&M University) recorded the site. The 100x100-m site consisted of a burned rock concentration exposed in a tank trail and surrounding flake scatter. A mounded area was depicted on the site map but not discussed on the site form. A dart point and side scraper were surface collected. An estimated 45 percent of the site was disturbed by tracked vehicles and erosion.

On 4 November 1992, Turpin and Frederick (Mariah Associates) revisited the site. The 100-m-diameter site was situated on a gentle east-facing slope formed over an outcrop of Paluxy sands. Although no good soil exposures were observed, exploration with a soil probe indicated that an A-AE-unknown profile was present over much of the area. Due to the hardness of the sediment, none of the probes penetrated more than 30 cm. Off-site to the north, rills and gullies exposed a thick (1.5 m) truncated soil consisting of a Bk1-Bk2-K-R profile formed within what appeared to be the Paluxy sand. Due to the lack of exposure and inability to probe below 30 cm, it was not known if a similar buried soil was present in the site area. Roads bisecting the site exposed two burned rock concentrations (designated Features 1 and 2) that appeared to be shallowly buried within the A and/or AE soil horizons prior to disturbance. Very little debitage was observed on the site. Due to the potential for intact cultural deposits, shovel testing was recommended.

On 10 November 1992 a crew excavated seven shovel tests with one shovel test placed on each of the burned rock features. Three shovel tests produced cultural materials. Those on Features 1 and 2 contained burned rocks and debitage to a maximum depth of 40 cm; however, most of the cultural materials occurred from 0–20 cm. Placed at the southwestern site margin, the third positive shovel test encountered a previously unrecorded feature consisting of 25 burned rocks at 0–20 cm (designated Feature 3).

Based on the shovel testing results, the site contained at least three burned rock features with potentially intact cultural materials. These cultural deposits were of unknown significance and were considered potentially eligible for NRHP listing. The recommended testing effort included 4–8 m<sup>2</sup> of manually excavated test units to determine eligibility (Trierweiler, ed. 1994: A1242–A1244).

### Work Performed

Prior to excavation, the site area was reinspected and the two previously recorded surface features (Features 1 and 2) were re-located and rerecorded (see Cultural Features). On 17 July 1996, Prewitt and Associates completed formal testing of 41CV1106 (Figure 34). The test excavations included seven 1x1-m test units (Test Units 1–7), with 3.1 m<sup>3</sup> manually excavated.

Near the eastern edge of the site, Test Unit 1 was placed just south of a roadcut and near the surface-exposed portion of Feature 1. Sloping from east (at 25 cm) to west (at 40 cm), undulating bedrock covered 70 percent of the test unit. Test Unit 2 was situated just upslope of Feature 2, which was exposed in a roadcut near the north-central site margin. The excavation was halted at 30 cm when an argillic horizon was encountered. Test Unit 3 was placed in the southern portion of the site in a densely vegetated area where burned rocks were exposed by bioturbation. Relative to the surrounding area, this vegetated section appeared slightly higher in elevation and potentially contained thicker deposits. The excavation was terminated at 100 cm due to the presence of weathered sandstone. Situated between Test Units 1 and 2, Test Unit 4 was excavated to an argillic horizon at 25–30 cm. Test Unit 5 was placed 15–20 m east of Test Unit 3 to define the eastern extent of the site. Its excavation was terminated at 20 cm when mottled matrix was encountered. However, a 30x30-cm quadrant in the northwest corner of the unit was excavated to 70 cm to provide an exposure for geomorphic interpretation. Placed 20 m northwest of Test Unit 3, Test Unit 6 was excavated in the vicinity of Feature 3. The excavation was halted when rubified, compact fill was encountered at 20 cm. Test Unit 7 was situated 10 m south of Test Unit 3. Excavated to a maximum depth of 75 cm, bedrock was encountered across the entire unit at 58–75 cm (sloping north-

west to southeast). A serrated-blade Ensor point was surface collected.

### Site Extent and Depth

The slope on which the site is situated is wedged between the Walnut clay and the Glen Rose limestone to the west and east, respectively. However, Paluxy sands continue an unknown distance to the north and south. Based on the horizontal extent of the cultural materials, the site measures approximately 90 m north-south by 60 m east-west. The testing results reveal the presence of at least one intact buried occupation zone demonstrated by Feature 4 buried at 42–63 cm in Test Unit 3.

### Sediments and Stratigraphy

The profiles of four test units were documented. These observations revealed a site stratigraphy consisting of pedogenically altered late Pleistocene and Holocene colluvial units of varying thicknesses resting on the Paluxy sand or Glen Rose limestone. The profiles from Test Units 5 and 6 represent a late Holocene colluvial mantle overlying a truncated late Pleistocene/Holocene soil. The 70-cm-thick soil profile of Test Unit 5 consists of a dark grayish brown fine sandy loam A horizon (0–31 cm) of late Holocene age overlying a truncated 2Bt-2BC soil. The 2Bt horizon (31–52 cm) consists of a brown sandy clay, and the underlying 2BC horizon (52–70+ cm) consists of a yellowish brown sandy clay with many rounded sandstone fragments. This truncated soil is formed on late Pleistocene/Holocene-age colluvial sediments that apparently were deposited during a period of bedrock erosion. The profile of Test Unit 6 consists of a very dark gray fine sandy loam A horizon (0–9 cm) overlying a reddish yellow to strong brown sandy clay loam 2Bt horizon (9–20+ cm).

The profiles of Test Units 1 and 3 represent a thick late Holocene colluvial mantle laying directly on the Paluxy sandstone, rather than a late Pleistocene/Holocene truncated soil. The profile of Test Unit 1 is imprinted with an A-Bw soil profile. The A horizon is a 24-cm-thick very dark gray sandy clay loam. The Bw horizon is a 16+-cm-thick brown to dark brown sandy clay with many rounded sandstone gravels. The late Holocene colluvium of Test Unit 3 is imprinted with three soils (A-2Ab-2Eb-3Ab-R profile). The

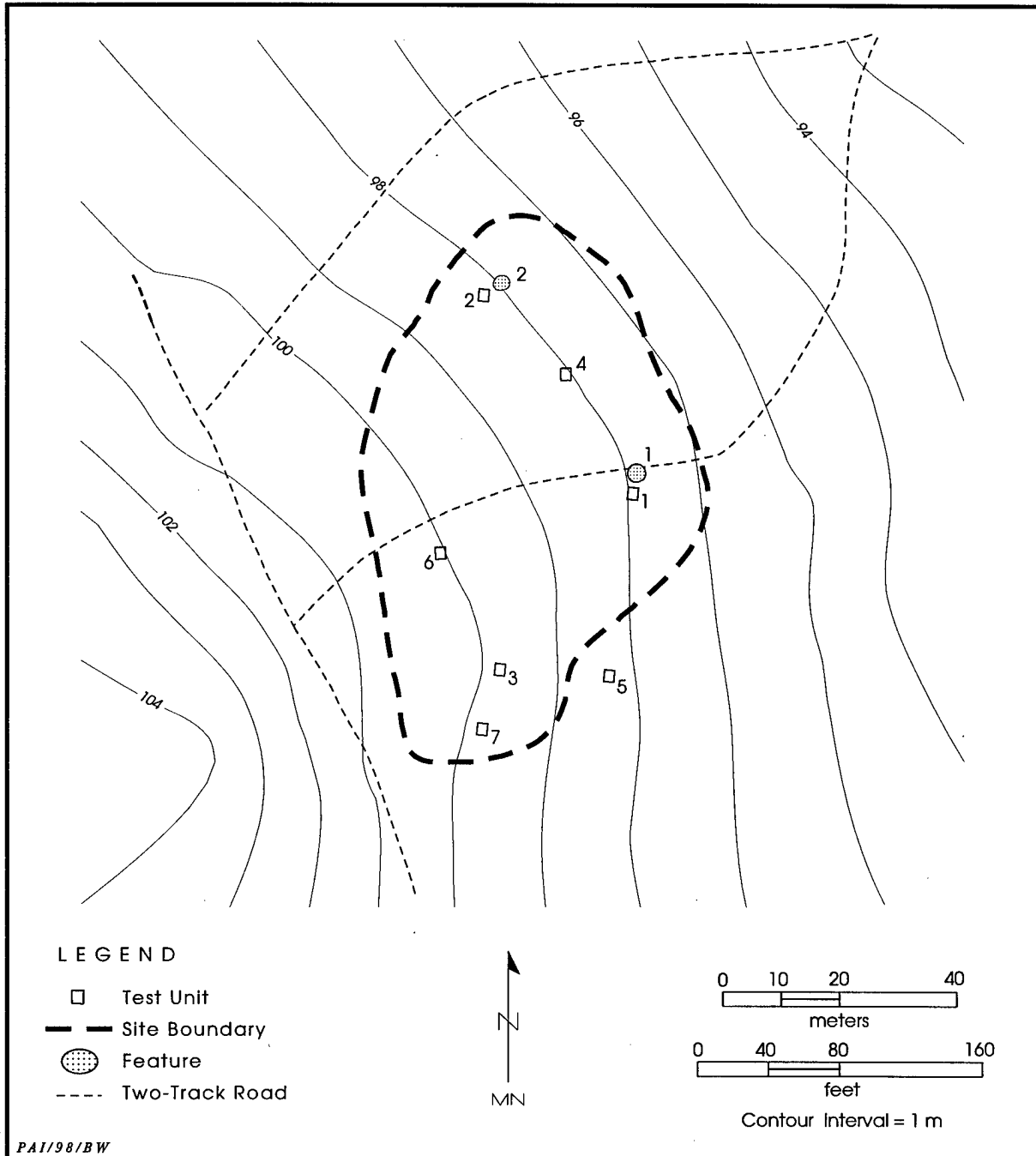


Figure 34. Site map, 41CV1106.

upper A horizon (0–10 cm) is a brown to dark brown loamy fine sand. It overlies a 44-cm-thick 2Ab-2Eb soil profile. The 2Ab horizon is a dark grayish brown fine sand and the 2Eb horizon is a brown loamy fine sand. The lower soil (3Ab horizon) is a 30-cm-thick dark grayish brown fine

sand that rests directly on the Paluxy sandstone.

#### Cultural Materials

Chipped lithic artifacts were recovered in four of the seven test units (Table 15). In Test

Table 15. Summary of cultural materials from 41CV1106

Provenience	Dart Points	Late-Stage/ Finished Biface	Miscellaneous Bifaces	Miscellaneous Uniface	Core	Unmodified Debitage	Totals
<b>TEST UNIT 1</b>							
Feature 1 (0–10 cm)*	1	–	1	1	–	9	12
Feature 1 (10–20 cm)	–	–	–	–	1	2	3
Level 3 (20–30 cm)	–	–	1	–	–	1	2
Subtotals	1	0	2	1	1	12	17
<b>TEST UNIT 2</b>							
Level 1 (0–10 cm)*	–	–	–	–	–	–	0
Level 2 (10–20 cm)	–	–	–	–	–	3	3
Subtotals	0	0	0	0	0	3	3
<b>TEST UNIT 3</b>							
Feature 4 (42–63 cm)	0	1	0	0	0	1	2
<b>TEST UNIT 4</b>							
Level 1 (0–10 cm)*	–	–	–	–	–	–	0
Level 2 (10–20 cm)*	–	–	–	–	–	9	9
Level 3 (20–30 cm)*	–	–	–	–	–	5	5
Subtotals	0	0	0	0	0	14	14
<b>GENERAL COLLECTION</b>							
Surface	1	0	0	0	0	0	1
Totals	2	1	2	1	1	30	37

\*Includes recent intrusive items.

Unit 1, Feature 1 was present in Levels 1 and 2 (0–20 cm) and produced considerable amounts of cultural materials (see Cultural Features). Below Feature 1, Level 3 (20–30 cm) yielded five burned rocks (1 kg), one flake, and one miscellaneous biface. Level 4 (30–40 cm) was culturally sterile.

Of three levels excavated in Test Unit 2, only a metal can and three flakes were found from 0–20 cm. Although the unit was placed near Feature 2, no evidence of the feature was encountered in the excavation.

From the surface to 100 cm in Test Unit 3, each level produced sparse to moderate amounts of burned rocks but no artifacts. Encountered across the entire unit at 42–63 cm, Feature 4 yielded dense burned rocks and sparse lithic artifacts (see Cultural Features). Directly below the feature at 66–68 cm, a pocket of ca. 50

*Rabdotus* shells was found near the southwest corner of the test unit; 20 were collected. It is not certain whether this represents a cultural or natural occurrence and was not formally designated a feature. In addition to this site, discrete pockets/concentrations of *Rabdotus* shells have been found in association with burned rock features at sites 41CV88 (Trierweiler, ed. 1996:182) and 41CV1191 (this report).

Test Unit 4 produced a total of 14 pieces of debitage from 10–30 cm. In addition, all three levels contained recent intrusive items.

Test Unit 5 was culturally sterile, while Test Unit 6 produced sparse burned rocks from 0–20 cm. Although Test Unit 6 was placed in the vicinity of Feature 3, no evidence of the feature was encountered. Of seven levels excavated in Test Unit 7, 10 small burned rocks were found from 20–50 cm.

### **Cultural Features**

In Test Unit 1, Feature 1 extended across the entire unit at 0–10 cm, but was present primarily along the east wall at 10–20 cm. The feature yielded a total of 282 burned rocks (25.5 kg), 11 flakes, 1 core, 1 miscellaneous uniface, 1 miscellaneous biface, and a button. Approximately 87 percent of the cultural materials were found from 0–10 cm, including a Pedernales point and the button. In Level 1, the majority of the burned rocks were fist-sized, angular pieces, while those in Level 2 consisted of smaller, highly fractured fragments. Feature 1 was bisected by north-south and east-west roadcuts, with the test unit situated just south of the latter. Based on the excavation results and surface exposures, the feature is estimated to be 3 m north-south by 2.5 m east-west. Due to its amorphous morphology, the feature is defined as a burned rock concentration. However, it appears to lack contextual integrity due to severe impacts by roadcuts, subsequent erosion, and pedoturbation.

Feature 2 measures 1.5 m east-west by 1 m north-south based on the surface exposure of burned rocks. It consists primarily of small to medium-sized burned rocks and is interpreted as a burned rock concentration. As with Feature 1, Feature 2 is bisected by a roadcut, appears severely disturbed, and lacks integrity. No evidence of the feature was encountered in Test Unit 2, excavated a few meters to the southwest.

Encountered from 42–63 cm in Test Unit 3, Feature 4 consisted of three layers of burned sandstone and limestone rocks ( $n = 129$ , 43.75 kg). The upper two rock layers extended across the entire unit, but the bottom layer was primarily contained in a 50x60-cm area in the south-central portion of the test unit. The ratio of limestone to sandstone was approximately 6.5 to 1. The majority of the burned rocks consisted of equal proportions of tabular and angular pieces ranging from 5 to 15 cm in size. The remainder were small fragments except for two slabs larger than 15 cm. The overwhelming majority were horizontally laid, with a few upright or on angle. No internal patterning was apparent. Artifacts recovered from the feature fill included one late-stage to finished biface and one flake. One of two processed flotation samples contained low frequencies of charred wood. Submitted for macrobotanical analysis, a third

flotation sample from 50–55 cm yielded no charred plant remains (see Appendix E). Charcoal from the feature fill yielded a radiocarbon age of  $390 \pm 40$  B.P. (Beta-102099, see Appendix A). Root activity minimally disturbed the feature. Burned rocks were visible in all four walls of the test unit, indicating that Feature 4 extends in all directions. Based on the findings in Test Unit 3, the excavation results of Test Units 5, 6, and 7, and the exposures afforded by animal burrows, Feature 4 is interpreted as a buried occupation zone which may cover 25 m<sup>2</sup>.

### **Discussion**

Although the majority of the test unit excavations did not encounter intact cultural deposits, Feature 4 represents a vertically discrete occupation zone at 42–63 cm that is approximately 20 cm thick. Based on the present exposures of cultural materials and the absence of the occupation zone in nearby test units, the horizontal extent of Feature 4 seems to be confined to a 5-m-diameter area. Although cultural remains in this area are exposed by animal burrowing, no such disturbance was apparent in Test Unit 3, suggesting that this impact is probably limited. Pockets of intact Paluxy sediment containing cultural materials may also be present elsewhere on this site.

Occupation during the Late Prehistoric period is indicated by the calibrated charcoal radiocarbon date of A.D. 1450–1625 (see Appendix A). Presently, this is the only Paluxy site at Fort Hood containing an intact, subsurface occupation corresponding to the Late Prehistoric Toyah phase. Although the occupations represented by Feature 4 produced sparse artifacts and macrobotanical remains, this may be a result of the limited sample.

The testing results demonstrate that this site can yield valuable data about relatively young occupations buried in the Paluxy setting. Therefore, 41CV1106 is recommended as eligible for listing in the NRHP.

### **41CV1138**

#### **Site Setting**

Site 41CV1138 is situated on a north-facing, gently sloping intermediate upland south of Table Rock Creek. Numerous tank trails bisect



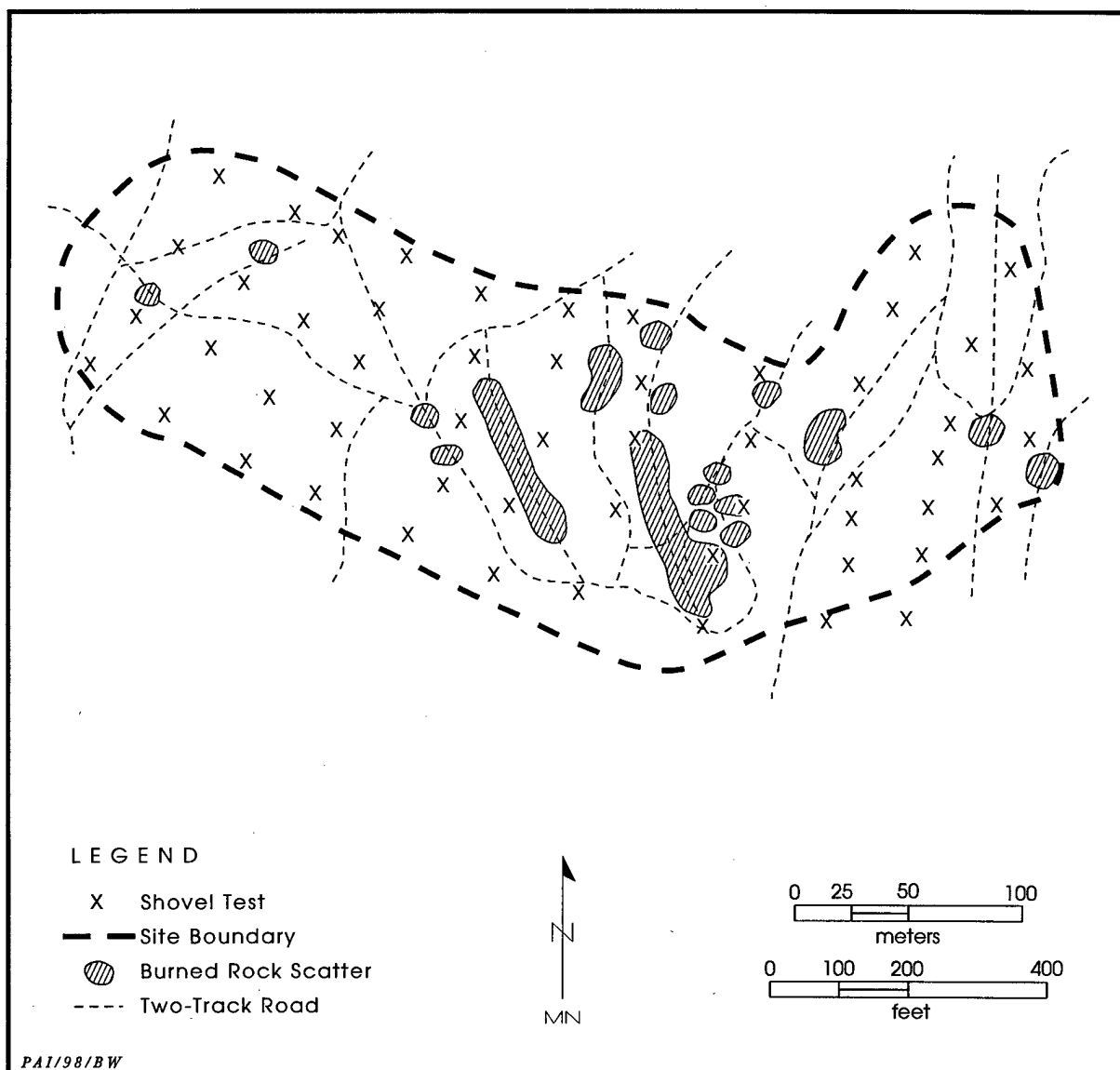
the site area, and many exhibit severe gullying. Isolated stands of juniper, post oak, and cedar elm trees, along with moderate understory growth, are present. Site elevation is 280 m above mean sea level.

### Previous Work

On 16 August 1985, Dureka and Strychalski (Texas A&M University) recorded the site as a small (120x70 m) camp containing two burned rock concentrations and a scatter of lithic arti-

facts. Some of the burned rocks were possibly sandstone and/or ground stone tools. One Ensor point and an end scraper were collected. An estimated 70 percent of the site was disturbed by vehicular traffic, erosion, and bivouac activity.

On 19 February 1993, Turpin and Abbott (Mariah Associates) revisited the site (Figure 35). The site was situated on a broad, gently sloping intermediate upland underlain by an outcrop of the Paluxy sandstone. Based on the extent of the exposed Paluxy sands and cultural materials, the maximum east-west dimension was



**Figure 35.** Site map, 41CV1138 (modified from Trierweiler, ed. 1994:A1278).

expanded from 70 m to just over 400 m. The site was mantled with a complex soil developed in a combination of bedrock, slopewash, and colluvial deposits. In the downslope (northeastern) part of the site, the underlying bedrock was Glen Rose limestone rather than Paluxy sandstone. Here, the site was developed in sandy slopewash sediments derived from the Paluxy sandstone upslope. Elsewhere, colluvial and slopewash sediments rested unconformably on a variably truncated, in situ soil developed in the Paluxy outcrop. In this portion of the site, the soil exhibited an idealized A21-2A22-2Bt21-3Bt22-3Bw23-3K-3C-3R profile. The upper A horizon was a brown loamy fine sand representing relatively recent colluvium and slopewash. The underlying 2A and 2Bt horizons also were developed in slopewash, but exhibited a much stronger degree of pedogenic alteration. The 2A horizon was a very dark brown sandy loam to loamy fine sand and had a weak, fine, blocky structure. The 2Bt horizon was a very strongly structured, dark red to dark reddish brown sandy clay. The structure of this horizon was disrupted in places, probably as a result of settling and downslope creep. Its lower boundary was an abrupt truncation surface that separated the slopewash mantle from the underlying horizons of the truncated, in situ soil. Downslope, the soil exhibited an A21-Bt21-2R profile consisting of a brown sandy loam over a discontinuous rubified sandy clay. Both of these horizons represented soil formed in sandy slopewash deposits that overlay hard, fractured limestone.

Although moderately impacted by sheet erosion, gullying, and bioturbation, a large portion of the site appeared undisturbed. Several roads were deeply incised (over 1 m), and burned rock concentrations and possible midden deposits containing associated lithic artifacts were exposed in many of these roadcuts. One Ensor and two Marshall points were surface collected. The exposures revealed that cultural materials were buried in the upper 30 cm of slopewash. Since the site had the potential for intact deposits, shovel testing was recommended.

On 22 February 1993, a crew excavated 54 shovel tests. Eight positive shovel tests (14.8 percent) yielded a total of 12 flakes, 1 piece of shatter, and 8 burned rocks. Cultural materials were recovered from 0–30 cm, with 13 items (62 percent) found at 0–10 cm. The presence of chert

artifacts was noted as being atypical of Paluxy sites.

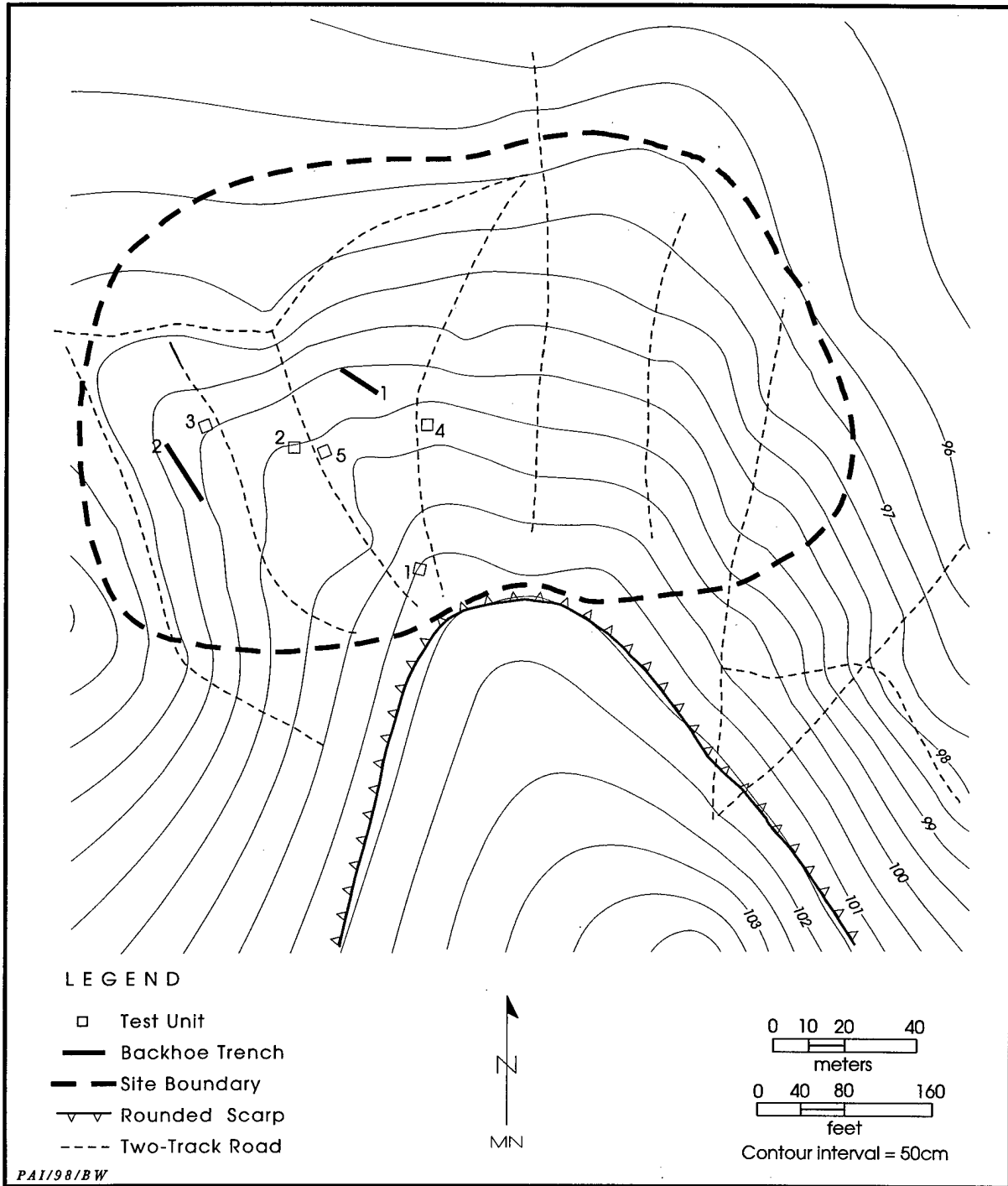
While the integrity of possible burned rock features exposed in roadcuts appeared dubious, the presence of relatively pristine areas within the large site suggested that the site had potential to contain intact cultural deposits of unknown significance. The recommended testing effort included at least 3–5 m<sup>2</sup> of manually excavated test units to determine NRHP eligibility (Trierweiler, ed. 1994:A1277–A1279).

### **Work Performed**

On 2 July 1996, Prewitt and Associates completed formal testing of 41CV1138. The test excavations were located primarily in the west-central portion of the site, where vertical exposures revealed buried cultural materials (Figure 36). The testing effort included two backhoe trenches (Backhoe Trenches 1 and 2) and five 1x1-m test units (Test Units 1–5). A total of 3.8 m<sup>3</sup> was manually excavated. One Castroville, one Edgewood, and two Ensor points were surface collected.

Placed approximately 50 m apart, Backhoe Trenches 1 and 2 were excavated in the area where shovel testing was most productive. Oriented to 120°, Backhoe Trench 1 measured 13.5x0.8x1.0 m. Backhoe Trench 2 was oriented to 155° and had maximum dimensions of 16.0x0.8x1.4 m. No cultural materials were observed in either trench.

Situated near the south-central (upslope) portion of the site, Test Unit 1 was placed between two tank trails where burned rocks were exposed. It was excavated to weathered Paluxy sandstone at 130 cm. One meter west of a deeply incised (1.5-m-deep) tank trail, Test Unit 2 was placed near burned rocks exposed at approximately 30 cm in the roadcut. Its excavation was terminated at 30 cm (2Bt horizon). Approximately 20 m west-northwest of Test Unit 2, Test Unit 3 was placed along the west edge of another tank trail in which burned rocks were exposed at ca. 30 cm. The unit was excavated to 40 cm (2Bt horizon). Test Unit 4 was located 40 m downslope (north) of Test Unit 1, along an incised tank trail (ca. 80 cm deep) where a few burned rocks were exposed from 30–40 cm. This excavation encountered bedrock at 140 cm. Test Unit 5 was situated 40 m northwest of Test Unit 1 and 10 m east of Test Unit 2. Placed



**Figure 36.** Map showing test units and backhoe trenches at 41CV1138.

adjacent to the east edge of a tank trail, the unit revealed a cluster of burned rocks at 30 cm. Excavation of Test Unit 5 was terminated at 40 cm (2Bt horizon).

#### Site Extent and Depth

The northern and southern site boundaries are delimited by outcrops of Glen Rose limestone

and Walnut Clay Formation, respectively. A major tank trail and gravel road are just beyond the previously identified eastern site boundary. The Paluxy sands tend to thin to the west. Based on the extent of the Paluxy sediments and exposures of cultural materials, the horizontal extent of the site was defined as 215 m east-west by 135 m north-south; however, the test excavations were clustered in an area measuring 75 m north-south by 80 m east-west. The vertical extent of cultural deposits is represented by Feature 1 at 29–38 cm in Test Unit 3, Feature 2 at 30–36 cm in Test Unit 5, and by chipped stone artifacts to a depth of 120 cm in Test Unit 1 and 140 cm in Test Unit 2.

### **Sediments and Stratigraphy**

Site stratigraphy at 41CV1138 consists of late Quaternary-age colluvial units resting on the Paluxy sandstone. In Backhoe Trench 2 these colluvial units consist of a thin mantle of late Holocene sand overlying a truncated late Pleistocene/Holocene-age soil. The late Holocene mantle is a 29-cm-thick yellowish brown sand exhibiting an A soil horizon. It overlies a truncated 2Bt soil formed on late Pleistocene/Holocene colluvium. The 2Bt horizon (29–53 cm) is a reddish brown sandy clay loam and has an abrupt smooth lower boundary. The 3BC horizon (53–104 cm) is a strong brown sandy clay loam and represents the remnants of an earlier soil. The truncated soil rests on Paluxy sandstone. In some excavation units, the late Pleistocene/Holocene soil was completely absent and relatively thick late Holocene colluvial units rested directly on the Paluxy sandstone. The latter deposits may represent infilled gullies.

### **Cultural Materials**

Cultural materials were recovered in all five of the test units (Table 16). Each level from 0–130 cm in Test Unit 1 contained burned rocks. A total of 184 burned rocks were found, with 130 (70.7 percent) occurring from 0–60 cm. Seven of 13 levels (53.8 percent) produced 18 flakes, 1 edge-modified flake, and 1 core tool; an untypeable dart point was recovered at 60–70 cm. In addition, five levels yielded charcoal. Bioturbation from animal burrowing was noted in some places from 25–100 cm.

Test Unit 2 contained a total of 38 flakes, 9

burned rocks, 1 edge-modified flake, 1 miscellaneous uniface, 1 late-stage to finished biface, and 1 multifunctional tool (spokeshave/miscellaneous uniface) from 0–30 cm.

In Test Unit 3, Levels 1 (0–10 cm) and 4 (30–40 cm) were culturally sterile. From 10–30 cm, a total of 10 pieces of debitage and 21 burned rocks (3 kg) were found. All of these materials are probably associated with Feature 1, which was present along the eastern edge of the test unit at 29–38 cm (see Cultural Features).

From 0–140 cm in Test Unit 4, all levels excluding 6 and 11 yielded 19 flakes, 1 core, 1 edge-modified flake, 1 dart point tip, and 16 burned rocks (2.25 kg). Although cultural materials were encountered throughout these deposits, no more than 6 artifacts were found in any one level. In addition, Level 1 consisted of mixed deposits, as evidenced by the presence of a metal can. All of the aforementioned cultural materials were contained in a brown loamy sand. At 70 cm, the western two-thirds of the unit consisted of the brown loamy sand, whereas the remaining matrix was a sandy, rubified fill. The darker sandy matrix comprised a smaller area with each successive level. At 110–130 cm, it was restricted to the northwest corner of the unit; it was present only in a narrow strip along the north wall at 130–140 cm. The decrease in areal extent with depth suggests that this sandy matrix represents an old gully fill.

Only modern cartridge cases were found from 0–10 cm in Test Unit 5. One miscellaneous uniface and 31 flakes were recovered at 10–30 cm, and Feature 2 was encountered across the western two-thirds of the unit at 30–36 cm (see Cultural Features). No cultural materials were contained in the nonfeature matrix at 30–40 cm.

### **Cultural Features**

Encountered at 29–38 cm, Feature 1, a hearth, was confined to the eastern edge of Test Unit 3 (Figure 37). Its maximum excavated dimensions are 90 cm north-south and 35 cm east-west; however, an overall size could not be estimated since an unknown portion of the feature was destroyed by the tank trail. The hearth consists of two layers of 25 burned rocks (11.5 kg), with smaller, angular burned rocks typically overlying larger, rounded, thin slabs (up to 20x10x5 cm). Several of these slabs were cracked in situ. A slight basin shape is indicated

Table 16. Summary of cultural materials from 41CV1138

Provenience	Dart Points	Late-stage/ Finished Biface	Miscellaneous Unifaces	Core Tool	Multifunctional Tool	Edge-modified Flakes	Core	Unmodified Debitage	Totals
<b>TEST UNIT 1</b>									
Level 1 (0–10 cm)	–	–	–	–	–	–	–	–	0
Level 2 (10–20 cm)	–	–	–	–	–	1	–	1	2
Level 3 (20–30 cm)	–	–	–	–	–	–	–	–	0
Level 4 (30–40 cm)	–	–	–	–	–	–	–	–	0
Level 5 (40–50 cm)	–	–	–	–	–	–	–	1	1
Level 6 (50–60 cm)	–	–	–	–	–	–	–	–	0
Level 7 (60–70 cm)	1	–	–	–	–	–	–	9	10
Level 8 (70–80 cm)	–	–	–	–	–	–	–	1	1
Level 9 (80–90 cm)	–	–	–	–	–	–	–	3	3
Level 10 (90–100 cm)	–	–	–	1	–	–	–	2	3
Level 11 (100–110 cm)	–	–	–	–	–	–	–	–	0
Level 12 (110–120 cm)	–	–	–	–	–	–	–	1	1
Level 13 (120–130 cm)	–	–	–	–	–	–	–	–	0
Subtotals	1	0	0	1	0	1	0	18	21
<b>TEST UNIT 2</b>									
Level 1 (0–10 cm)	–	–	–	–	1	1	–	2	4
Level 2 (10–20 cm)	–	–	1	–	–	–	–	26	27
Level 3 (20–30 cm)	–	1	–	–	–	–	–	10	11
Subtotals	0	1	1	0	1	1	0	38	42
<b>TEST UNIT 3</b>									
Level 1 (0–10 cm)	–	–	–	–	–	–	–	–	0
Level 2 (10–20 cm)	–	–	–	–	–	–	–	6	6
Level 3 (20–30 cm)	–	–	–	–	–	–	–	4	4
Level 4 (30–40 cm)	–	–	–	–	–	–	–	–	0
Feature 1 (29–38 cm)	–	–	–	–	–	1	–	–	1
Subtotals	0	0	0	0	0	1	0	10	11
<b>TEST UNIT 4</b>									
Level 1 (0–10 cm)*	1	–	–	–	–	–	–	–	1
Level 2 (10–20 cm)	–	–	–	–	–	–	–	1	1
Level 3 (20–30 cm)	–	–	–	–	–	1	–	1	2
Level 4 (30–40 cm)	–	–	–	–	–	–	–	4	4
Level 5 (40–50 cm)	–	–	–	–	–	–	–	–	0
Level 6 (50–60 cm)	–	–	–	–	–	–	–	–	0
Level 7 (60–70 cm)	–	–	–	–	–	–	–	3	3
Level 8 (70–80 cm)	–	–	–	–	–	–	–	–	0
Level 9 (80–90 cm)	–	–	–	–	–	–	–	6	6
Level 10 (90–100 cm)	–	–	–	–	–	–	–	1	1
Level 11 (100–110 cm)	–	–	–	–	–	–	–	–	0
Level 12 (110–120 cm)	–	–	–	–	–	–	–	2	2
Level 13 (120–130 cm)	–	–	–	–	–	–	–	–	0
Level 14 (130–140 cm)	–	–	–	–	–	–	1	1	2
Subtotals	1	0	0	0	0	1	1	19	22
<b>TEST UNIT 5</b>									
Level 1 (0–10 cm)*	–	–	–	–	–	–	–	–	0
Level 2 (10–20 cm)	–	–	1	–	–	–	–	11	12

Table 16, continued

Provenience	Dart Points	Late-stage/ Finished Biface	Miscellaneous Unifaces	Core Tool	Multifunctional Tool	Edge-modified Flakes	Core	Unmodified Debitage	Totals
TEST UNIT 5, continued									
Level 3 (20–30 cm)	–	–	–	–	–	–	–	20	20
Level 4 (30–40 cm)	–	–	–	–	–	–	–	–	0
Feature 2 (30–36 cm)	–	–	–	–	–	–	–	8	8
Subtotals	0	0	1	0	0	0	0	39	40
GENERAL COLLECTION									
Surface	4	0	0	0	0	0	0	0	4
Totals	6	1	2	1	1	4	1	124	140

\*Modern artifacts were encountered.

by rocks that dip east toward the apparent center of the hearth. One edge-modified flake was recovered from the feature fill. Charcoal flecking is common throughout the matrix, and charcoal collected from the base of the hearth (38 cm) yielded a radiocarbon age of  $2460 \pm 40$  B.P. (Beta-102100, see Appendix A). A flotation sample collected at 30–36 cm contained charred macrobotanical remains of *Quercus* wood (see Appendix E). Two additional flotation samples contained sparse amounts of microdebitage and charred wood. Aside from the tank trail, the feature was only minimally disturbed by root intrusion.

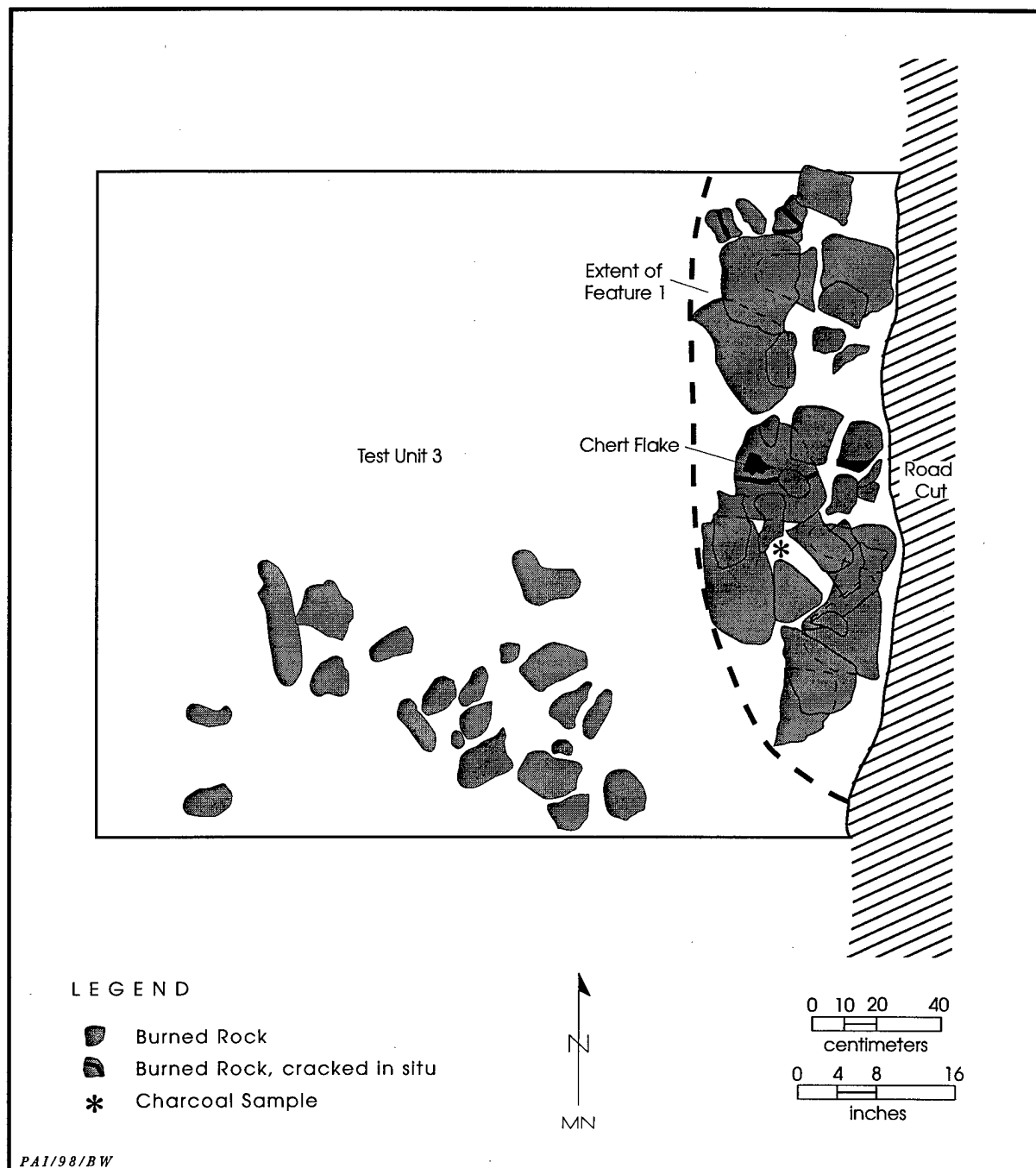
Feature 2, a burned rock concentration, is present at 30–36 cm in Test Unit 5. It extends across most of the unit and has maximum excavated dimensions of 100 cm north-south by 90 cm east-west. It consists of two layers of horizontally laid burned limestone ( $n = 55$ , 11 kg). The rocks range in size from 3x3x2 cm (small, angular fragments) to 20x9x4 cm (slabs), but the majority are medium-sized tabular and angular pieces. Two patches (a 50x30-cm area in the southwest quadrant and a 20x13-cm section near the center of the unit) of a darker brown soil (as opposed to the surrounding pale, unconsolidated sandy matrix) may represent concentrations of decayed organic matter. The feature fill yielded eight flakes, and a processed flotation sample contained a small amount of charred wood. Burned rocks visible in the north and south walls of the test unit and in the road cut indicate that

the feature extends 140 cm north-south; however, its east-west dimension is unknown due to the impact of the tank trail.

### Discussion

Although shallowly buried, an intact hearth (Feature 1) containing oak wood and a burned rock concentration (Feature 2) were encountered in separate test units spaced approximately 50 m apart. Both features were buried between 29 and 38 cm and rest on the contact with the 2Bt horizon. Being horizontally and stratigraphically discrete, these features may be associated and suggest the presence of at least one isolable component at the central portion of the site. Utilization of the hearth during the Late Archaic period is indicated by the calibrated charcoal radiocarbon date of 760–415 B.C. (see Appendix A). Although not recovered from intact deposits, four surface-collected diagnostic projectile points also correlate to this time period.

Although no intact features or discrete occupation zones were encountered in Test Units 1 and 4, the presence of cultural materials throughout the 130–140-cm-thick sediments is indicative of the intrasite variability of the Paluxy deposits. These deep deposits probably represent old gullies that filled with sandy Paluxy sediments at the time the site was occupied. Consequently, these areas have a greater potential for stratigraphic separation of occupational zones/



**Figure 37.** Plan of Feature 1 in Test Unit 3, 41CV1138.

episodes than do the more-shallow sediments that cover most of the site. In addition, this site could provide substantial data on Paluxy site formation processes. Based on the testing results, site 41CV1138 is considered significant and recommended as eligible for listing in the NRHP.

#### 41CV1143

##### Site Setting

The site is situated on a gently sloping up-land bench south of Table Rock Creek and north

of an unnamed tributary of Cottonwood Creek (Figure 38). Numerous tank trails crisscross the site, and vegetation is confined to patchy, isolated stands of post oak, shin oak, and juniper. Site elevation is 275 m above mean sea level.

### Previous Work

On 21 August 1985, Masson and Turpin

(Texas A&M University) recorded the site. A burned rock mound and several burned rock concentrations were noted, but their site map only depicts two burned rock concentrations. Bifaces, debitage, and burned rocks were scattered across the surface, and one biface was collected. Maximum site dimensions were recorded as 150x90 m, and an estimated 75 percent of the site was impacted by tracked vehicles

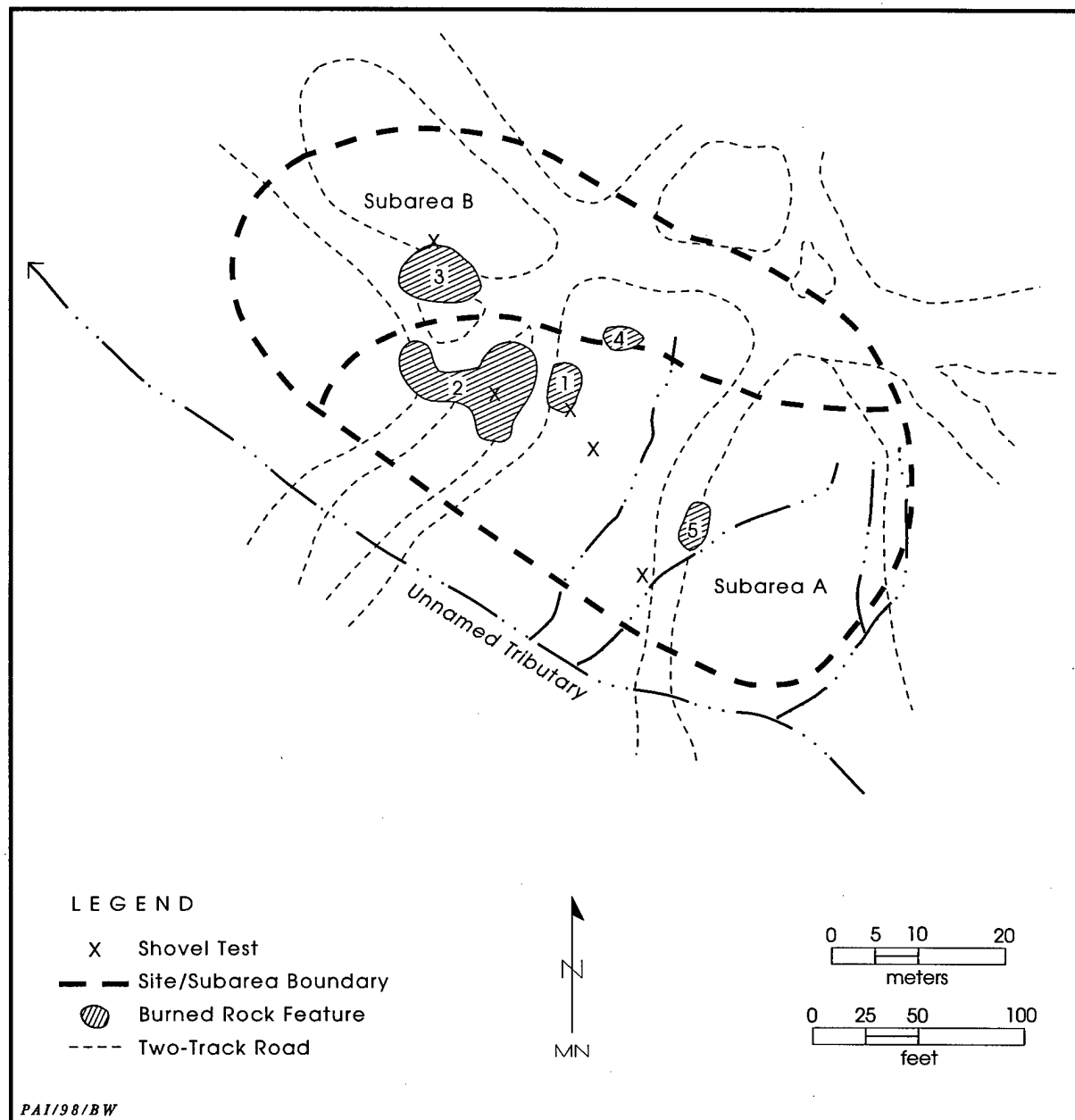


Figure 38. Site map, 41CV1143 (modified from Trierweiler, ed. 1994:A1286).



and erosion.

Abbott and Kleinbach (Mariah Associates) reevaluated the site on 23 September 1992. The site represented an open camp situated on a sloping upland bench of Paluxy sands and Walnut Formation. Based on the extent of the landform and exposed cultural materials, the site size was reduced to ca. 80 m northwest-southeast by 40 m northeast-southwest. The site was divided into two subareas based on the bedrock lithography.

Subarea A denotes the downslope outcrop of the Paluxy sands where a truncated, strongly developed sandy soil (consisting of a highly rubified Bt-Bk-Cox horizon sequence) underlies the 10–25-cm-thick accumulation of slopewash sediments. This subarea was heavily impacted by vehicular traffic, with a few relatively undisturbed areas located under trees. Subsequent erosional impacts were severe, particularly in the upslope end and along roads oriented parallel to the slope. Here, a number of gullies have incised up to 1 m deep into the underlying bedrock, exposing shallowly buried cultural materials. Four burned rock concentrations (Features 1, 2, 4, and 5) were located in or alongside these roadcuts. Measuring 12 m long and 50 cm wide, Feature 1 was buried at 35–50 cm and consisted of tabular burned rocks with associated debitage. Based on its morphology, this feature was thought to possibly represent a series of subsurface hearths. A dart point was surface collected adjacent to Feature 1. Comprised of angular burned rocks and flakes, Feature 2 (5x2 m) was severely impacted by tank tracks. Feature 4 was a small cluster (100x50 cm) of burned rocks located on the south edge of a tank trail. Also highly disturbed by erosion, Feature 5 consisted of angular burned rocks within a 3x3-m area. Due to the potential for buried cultural deposits, shovel testing was recommended for Subarea A.

Subarea B subsumed the upslope margin of the site underlain by Walnut clay. The majority of this subarea lacked appreciable deposition, except for one localized area of slopewash sediments in the vicinity of Feature 3 (a burned rock concentration). Exposed by tank tracks, this 9x8-m feature consisted of small angular burned rocks and debitage. In Subarea B, shovel testing was recommended only in the immediate vicinity of Feature 3.

On 1 October 1992, a crew excavated five shovel tests. Of four shovel tests excavated in

Subarea A, only the one placed adjacent to Feature 1 produced cultural materials. One flake and 10–15 burned rocks were found at 20–30 cm; the shovel test was terminated when a solid layer of burned rocks was encountered at 30 cm. In Subarea B, a shovel test excavated to 40 cm on Feature 3 yielded one burned rock at 0–10 cm. Based on these results, Subarea A had the potential to contain intact cultural deposits of unknown significance, particularly in the vicinity of Feature 1. However, intact deposits were not considered to be present in Subarea B. The recommended testing effort included a minimum of 2 m<sup>2</sup> of manually excavated test units to determine the NRHP eligibility of Subarea A. No further management was recommended for Subarea B since the cultural materials there lacked contextual integrity (Trierweiler, ed. 1994: A1285–A1287).

### Work Performed

On 9 July 1996, Prewitt and Associates completed formal testing of Subarea A at site 41CV1143 (Figure 39). A visual reinspection failed to re-locate the previously recorded features, except for Feature 1. Scattered burned rocks were observed over a large area, and it appeared that the boundary between Subareas A and B as depicted on the 1992 site map was incorrect. To correct this, the site boundary was enlarged to ca. 90 m northwest-southeast by 70 m northeast-southwest to encompass all of the areas where cultural materials were found, and the Subarea A and B distinction was ignored. Test excavations included three 1x1-m test units; a total of 2.3 m<sup>3</sup> was manually excavated.

Test Unit 1 was placed near the east edge of the roadcut where Feature 1 was exposed; it abutted the western edge of one of the previously excavated shovel tests. The unit was oriented to 350°, and excavated to an argillic horizon at 40 cm. Test Units 2 and 3 were oriented to magnetic north. Approximately 2 m south of where burned rocks were exposed in a roadcut, Test Unit 2 was excavated to weathered sandstone at 160 cm. Encountering the argillic horizon at 27 cm, Test Unit 3 was placed ca. 6 m northwest of another cluster of burned rocks.

### Site Extent and Depth

The southwest-facing slope is wedged

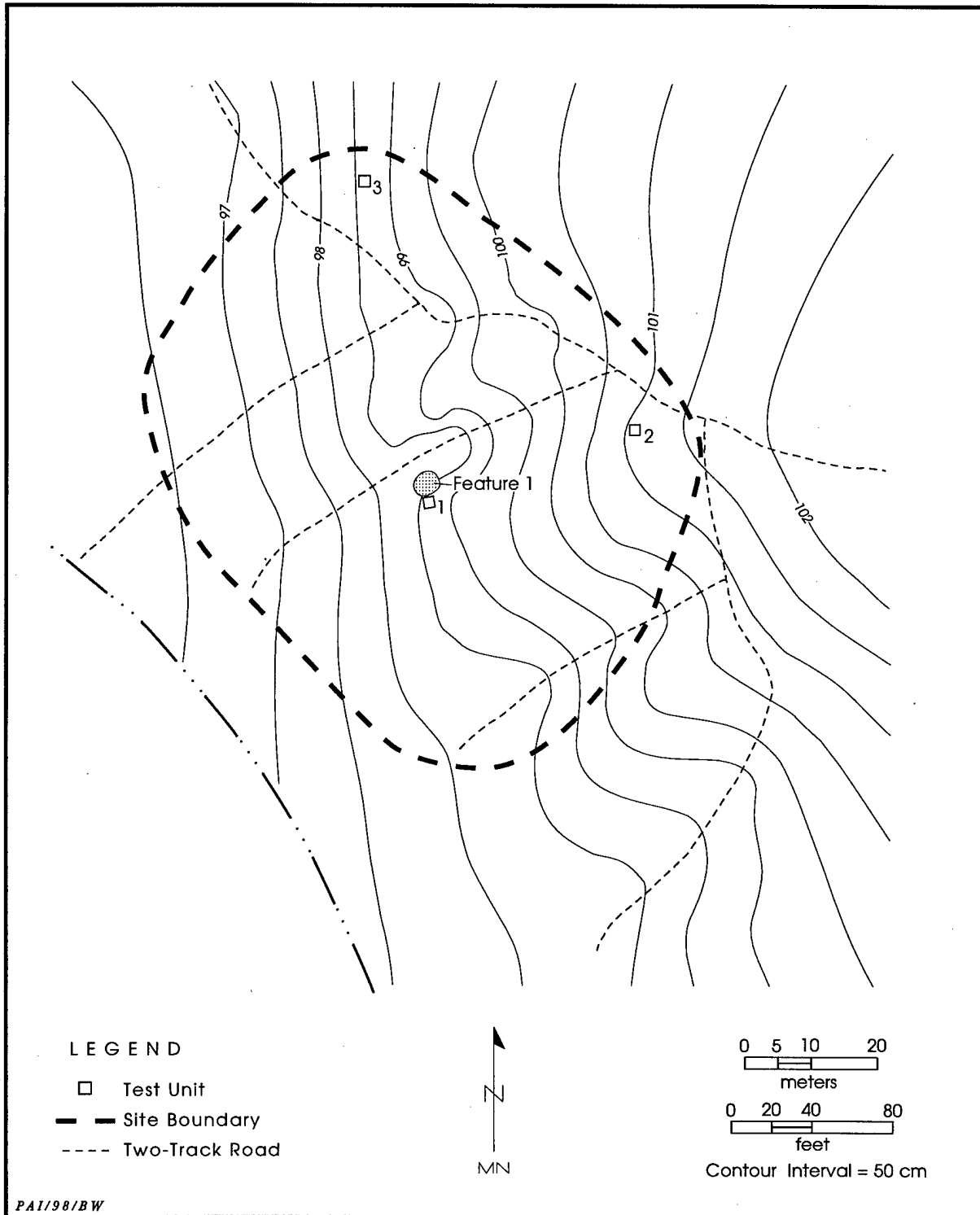


Figure 39. Map of Subarea A, 41CV1143.

between the upland surface (to the northeast) and an unnamed tributary (to the southwest). The Paluxy sand deposit gradually thins to the northwest and southeast. Based on the areal extent of cultural materials and the testing results, Subarea A covers an area measuring 85 m northwest-southeast by 70 m northeast-southwest. The vertical extent is represented by intact burned rock features buried in Test Unit 1 at 14–28 cm and Test Unit 2 at 24–43 cm.

### **Sediments and Stratigraphy**

The stratigraphy and soil horizons of site 41CV1143 were examined in the roadcut near Test Unit 1. A 56+-cm-thick profile was described in detail; it consisted of sandy late Pleistocene to Holocene-age colluvium imprinted with an A-2Bt soil profile. The A horizon is a dark brown (10YR 3/3) loamy fine sand. The underlying truncated 2Bt horizon is a strong brown (7.5YR 5/6) sandy clay loam. The 2Bt horizon becomes redder in hue (5YR 4/6) and is better developed downslope.

### **Cultural Materials**

Only Test Unit 3 produced lithic artifacts, consisting of two flakes and one untyped, serrated arrow point at 0–20 cm. All three test units contained burned rocks, with Test Unit 1 yielding the greatest number ( $n = 38$ , 5 kg) at 10–30 cm. Test Unit 1 also produced metal fragments and rifle cartridge cases in Level 1 (0–10 cm).

### **Cultural Features**

Feature 1-A, a discrete burned rock concentration within previously recorded Feature 1, was encountered from 14–28 cm in Test Unit 1. Confined to the eastern half of the test unit, this feature has maximum excavated dimensions of 100 cm north-south by 45 cm east-west. A single layer of 38 burned rocks (12 kg) was horizontally laid and exhibited no imbrication. Two tabular burned rocks averaged 12x10x2 cm in size, with the remaining pieces being fist sized and angular. Some of the burned rocks were fossiliferous limestone and were very friable. Burned rocks visible in the east wall and northeast corner profiles indicate that the feature extends an unknown distance in these directions. No cultural materials were recovered from the

feature fill; however, charcoal yielded a radiocarbon age of  $1200 \pm 40$  B.P. (Beta 102101, see Appendix A). A processed flotation sample (not submitted for macrobotanical analysis) contained a few mussel shell fragments. Burned rocks were scattered in the matrix surrounding the feature. Two burned slabs (each ca. 12 cm long and 3 cm thick) were visible in the west wall profile and probably are associated with the burned rocks encountered in the 1992 shovel test.

Encountered in Test Unit 2 at 24 cm, Feature 6, a hearth, extended to 43 cm. Confined to the southern half of the unit, the feature has maximum excavated dimensions of 100 cm east-west by 50 cm north-south with an arc-shaped perimeter. Burned rocks visible in the south wall of the test unit suggest that only the feature's northern edge was exposed in the excavation. A single layer of 27 burned rocks (19 kg) exhibited very little imbrication; most were horizontally laid. The majority of burned rocks were tabular pieces (ranging from 10x10x5 to 5x5x2 cm, with some large slabs up to 30x20x10 cm). The feature fill did not yield any artifacts, but burned rocks were found in the surrounding matrix. Charcoal from the hearth yielded a radiocarbon age of  $2210 \pm 40$  B.P. (Beta 102102, see Appendix A). A flotation sample collected from 35–43 cm was submitted for macrobotanical analysis but did not contain charred plant remains (see Appendix E).

### **Discussion**

Utilization of the area during the Late Archaic and into the Late Prehistoric period is indicated by calibrated radiocarbon dates of 365–190 B.C. and A.D. 785–885 (see Appendix A). Discrete cultural deposits are evidenced by burned rock features with associated organic remains buried between 14 and 43 cm below surface. Although these features are shallowly buried, they appear intact. No modern or historic items were recovered during testing, and no evidence of disturbance or bioturbation was observed. Although few artifacts were recovered from the excavations, which may be due in part to limited sampling, it has been observed that some Paluxy sites produce little debitage and few lithic tools. Based on the presence of discrete buried components, 41CV1106 is recommended as eligible for listing in the NRHP.

## **41CV1191**

### **Site Setting**

Site 41CV1191 is situated on both sides of an unnamed tributary of Ripstein Creek. The portion of the site northwest of the tributary contains thicker colluvial and alluvial deposits, while the area to the southeast is mantled with shallow Paluxy-derived sediments. Springs seeping from the limestone upland are located just beyond the northwestern site margin. Although tank trails parallel the western and southern site boundaries, the overwhelming majority of the site supports junipers, live oaks, post oaks, and a thick understory growth. Site elevation is 320 m above mean sea level.

### **Previous Work**

The site was initially recorded as a burned rock scatter by McCabe and Schweigert (Texas A&M University) on 6 October 1986. In addition to two burned rock concentrations, a few flakes and a biface were observed. The site dimensions were 125x100 m, with ca. 90 percent of the surface disturbed by erosion and vehicular traffic.

Frederick and Trierweiler (Mariah Associates) revisited the site on 11 June 1992. The site was situated on a gentle colluvial slope that formed along the contact between the Paluxy sand and Glen Rose limestone. A limestone ledge of the Walnut Formation formed a scarp that delimited the site on the south and west. Based on the exposures of cultural materials, the maximum site size was reduced to 110x80 m. Burned rocks and lithic artifacts were shallowly buried (i.e., less than 50 cm) within weathered Paluxy sediments in which A-Bw-C and A-C soil profiles had formed. The fill underlying a narrow tributary floodplain that bisected the site was not examined in detail, but appeared to be equivalent to the West Range alluvium. Two burned rock features were located at opposite ends of the site. Near the northwest site boundary, Feature 1 was described as an intact burned rock mound measuring 12 m in diameter. Visual relief was only 30 cm, but the feature seemed to be partially buried on the upslope (west) side. A small, highly disturbed burned rock concentration was exposed in an eroded tank trail at the southeast site margin, but this concentration was not designated a feature. Based on the

potential for buried cultural deposits, shovel testing was warranted.

On 30 June 1992, a crew excavated 11 shovel tests. One test placed on Feature 1 yielded 46 burned rocks and 8 flakes from 0–30 cm. Another test placed ca. 25 m downslope (southeast) of this feature yielded 16 burned rocks and 34 flakes from 10–52 cm. Four additional randomly placed shovel tests were positive; each yielded varying amounts of burned rocks. Based on testing results, the site had the potential for intact cultural deposits of unknown significance. The recommended testing effort included a minimum of 4–6 m<sup>2</sup> of manually excavated test units to determine NRHP eligibility (Trierweiler, ed. 1994:A1335).

### **Work Performed**

Prior to excavation, the site area was resurveyed and the two previously recorded features were re-located. In the area of Feature 1, burned rocks were scattered on the surface; however, no distinct relief was apparent. At the location of the burned rock concentration (herein designated Feature 4), burned rocks were observed resting on bedrock. Since the site was investigated in 1992, a tank trail and subsequent erosion have impacted the cultural deposits in some areas and destroyed the integrity of this feature.

On 15 August 1996, Prewitt and Associates completed formal testing of 41CV1191 (Figure 40). The test excavations included one backhoe trench and six 1x1-m test units (Test Units 1–6). A total of 4.6 m<sup>3</sup> was manually excavated.

Backhoe Trench 1 and Test Units 1–4 were excavated in Paluxy sediments northwest of the tributary, while Test Units 5 and 6 were excavated in Paluxy sediments southeast of the drainage. Oriented to 295°, Backhoe Trench 1 had maximum dimensions of 22.0x0.8x1.9 m. Although the west end of the trench was situated ca. 10 m east (downslope) of Feature 1, only sparse burned rocks were scattered throughout the upper meter of the deposit. Excavated to bedrock at 138 cm, Test Unit 1 was placed about 10 m south of the exposed portion of Feature 1. Test Unit 2 was located approximately 15 m downslope (east) of Test Unit 1, and Test Unit 3 was excavated contiguous with Test Unit 2; both excavations were arbitrarily terminated at 90 cm. Placed on the exposed portion of Feature 1, Test Unit 4 encountered bedrock at a maximum

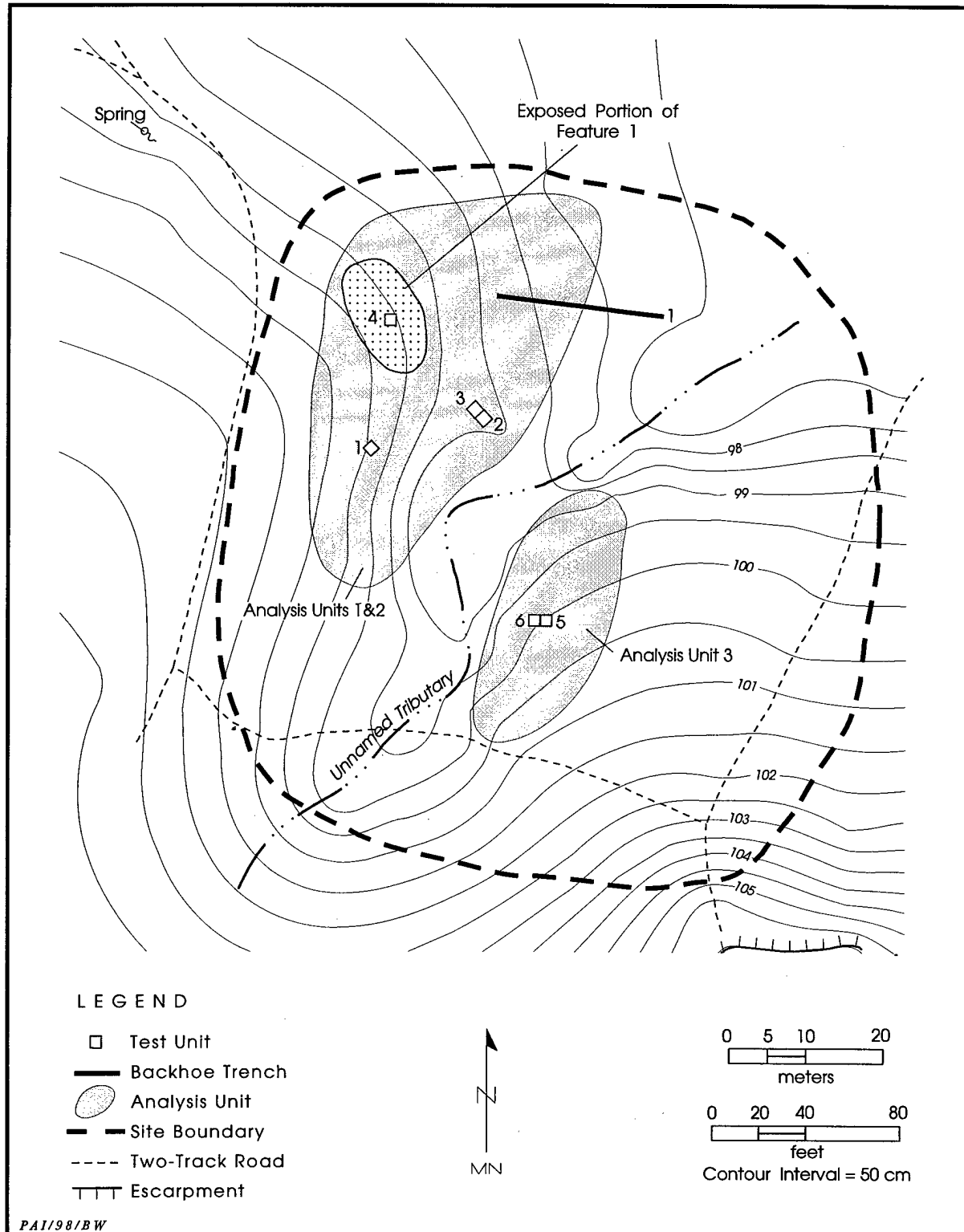


Figure 40. Site map, 41CV1191.

depth of 50 cm. Contiguous Test Units 5 and 6 were placed approximately 7 m east of the tributary and near a previously excavated shovel test that yielded 48 burned rocks from 0–40 cm. Both units were excavated to bedrock at 50 cm. Test Units 1–3 were oriented to 330–340°, while Test Units 4–6 were oriented to magnetic north.

### **Site Extent and Depth**

The south and west site boundaries are defined by the edge of the upland escarpment. Although the landforms continue an unknown distance to the north and east, the site dimensions are 95 m north-south by 85 m east-west based on the testing results and areal extent of cultural materials. The vertical extent of cultural materials is represented by Feature 1 from 0–48 cm in Test Unit 1, Feature 2 at 20–44 cm in Test Units 2 and 3, and Feature 3 at 10–30 cm in Test Units 5 and 6. In addition, chipped stone artifacts were recovered from the surface to a depth of 60–80 cm in various test units.

### **Sediments and Stratigraphy**

The sediments and stratigraphy of site 41CV1191 consist of colluvium-mantled slopes and valley alluvium. Backhoe Trench 1 sampled the valley alluvium, while the test units sampled the colluvial deposits on the valley slopes. Only the profile of the backhoe trench was described in detail (see Appendix B). The 184+-cm-thick profile of Backhoe Trench 1 consists of dark gray to dark grayish brown loamy alluvium overlying brown gravelly alluvium. These sediments, which rest on weathered Glen Rose limestone, are probably late Holocene in age and correlate to the West Range alluvium (Nordt 1992). The alluvium is imprinted with one soil (A-Bwk-Ck profile).

The valley slopes are mantled by Paluxy-derived sandy colluvium. The lower slopes are mantled by loamy sediments weathered from the underlying Glen Rose limestone. Both types of colluvial deposits are generally less than 1 m thick. Soil imprints on these deposits suggest that they are late Holocene in age.

### **Definition of Analysis Units**

Based on the presence of different geomorphic surfaces and chronometric and relative dating of deposits, three analysis units are identi-

fied. On the colluvial slope and terrace northwest of the tributary, Analysis Unit 1 encompasses temporally younger deposits, whereas Analysis Unit 2 corresponds to the underlying, older deposits. This area is estimated to be approximately 60x35 m in size (ca. 2,100 m<sup>2</sup>). Analysis Unit 3 encompasses a ca. 15x35-m area (525 m<sup>2</sup>) of slope containing Paluxy sediments southeast of the drainage in the vicinity of two test excavations.

### **Analysis Unit 1**

Analysis Unit 1 includes portions of the colluvial slope and Holocene-age terrace. The deposits encompassing this unit extend from 0–60 cm in Test Unit 1, and all of the sediments from 0–90 cm in Test Units 2 and 3. An intact burned rock feature and associated cultural materials are included in this analysis unit.

### **Cultural Materials**

Cultural materials associated with Analysis Unit 1 were recovered from Test Units 1–3 (Table 17). Each level from 0–60 cm in Test Unit 1 produced cultural materials. These include a total of 89 burned rocks (19.1 kg), 118 pieces of debitage, 1 limestone mano, and 7 lithic tools (including 2 Scallorn points and an arrow barb at 40–50 cm).

Since Test Units 2 and 3 were contiguous and the recovery from each was similar, their results are considered together here. The majority of levels produced cultural materials, consisting of 1 unmodified mussel shell, 9 vertebrate bone fragments (see Appendix D), 1 metate fragment, 150 burned rocks (19 kg), 1 core, 790 flakes, and 30 lithic tools. The diagnostic artifacts include one Ensor point found at 21 cm and three Darl points from 10–40 cm (two were found in situ at 23 and 38 cm). Levels 2–4 (10–40 cm) contained approximately 88 percent of all the cultural materials recovered. These materials appear to be associated with Feature 2 (see Cultural Features). At 30–32 cm, 20 *Rabdotus* shells were concentrated in (and subsequently collected from) a 14x12-cm area about 5 cm beyond the northeast edge of the feature.

### **Cultural Features**

Encountered from 20–44 cm, Feature 2 (a hearth) was contained entirely within Test

Table 17. Summary of cultural materials from 41CV1191, Analysis Unit 1

Provenience	Arrow Points	Dart Points	Perforator	Bifaces	Unifaces	Multifunctional Tool	Edge-modified Flakes	Cores	Unmodified Debitage	Manos	Metates	Unmodified Bones	Unmodified Shell	Totals
TEST UNIT 1														
Level 1 (0-10 cm)	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Level 2 (10-20 cm)	-	-	-	1	-	-	-	1	19	-	-	-	-	21
Level 3 (20-30 cm)	1	-	-	2	1	-	-	-	27	1	-	-	-	31
Level 4 (30-40 cm)	-	-	-	-	-	-	-	-	29	-	-	-	-	29
Level 5 (40-50 cm)	2	-	-	-	-	-	-	-	26	-	-	-	-	28
Level 6 (50-60 cm)	-	-	-	-	-	-	-	-	16	-	-	-	-	16
Subtotals	3	0	0	3	1	0	0	1	118	1	0	0	0	127
TEST UNIT 2														
Level 1 (0-10)	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Level 2 (10-25)*	-	2	-	1	2	-	2	1	193	-	-	-	-	201
Level 3 (20-30, partial)	-	1	-	1	1	-	1	-	91	-	-	9	-	104
Level 4 (30-40)	-	-	-	-	-	-	-	-	102	-	1	-	-	103
Level 5 (40-50)	-	1	-	-	-	-	1	-	34	-	-	-	-	36
Level 6 (50-60)	-	-	-	-	-	-	-	-	3	-	-	-	-	3
Level 7 (60-70)	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Level 8 (70-80)	-	-	-	-	-	-	-	-	2	-	-	-	-	2
Level 9 (80-90)	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Subtotals	0	4	0	2	3	0	4	1	425	0	1	9	0	449
TEST UNIT 3														
Level 1 (0-10 cm)	-	-	-	1	-	-	-	-	-	-	-	-	-	1
Level 2 (10-20 cm)	-	1	-	2	1	-	3	-	82	-	-	-	-	89
Level 3 (20-30 cm)	-	1	-	-	1	1	1	-	140	-	-	-	1	145
Level 4 (30-40 cm)	-	1	-	2	-	-	1	-	91	-	-	-	-	95
Level 5 (40-50 cm)	-	-	1	-	-	-	-	-	42	-	-	-	-	43
Level 6 (50-60 cm)	-	-	-	-	-	-	-	-	9	-	-	-	-	9
Level 7 (60-70 cm)	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Level 8 (70-80 cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Level 9 (80-90 cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Subtotals	0	3	1	5	2	1	5	0	365	0	0	0	1	383

Table 17, continued

Provenience	Arrow Points	Dart Points	Perforator	Bifaces	Unifaces	Multifunctional Tool	Edge-modified Flakes	Cores	Unmodified Debitage	Manos	Metates	Unmodified Bones	Unmodified Shell	Totals
Feature 2 (20-44 cm)	0	0	0	0	1	0	1	0	79	1	2	0	0	84
Totals	3	7	1	10	7	1	10	2	987	2	3	9	1	1,043

\* This level reflects a field error in which approximately 70 percent of the cultural materials recovered from 20-25 cm were inadvertently added to the cultural materials recovered from 10-20 cm.



Units 2 and 3. Almost circular in outline, the hearth had maximum dimensions of 67x64 cm (Figure 41). The feature was comprised of 63 (16 kg) overlapping burned rocks, two to three layers thick. The majority of these rocks were fist sized and smaller, with both angular and blocky fragments represented. The remaining rocks were large tabular pieces (up to 25x17x5 cm), and some of these were fractured in situ. Approximately 20 percent of the rocks slope toward the center of the hearth, producing a shallow basin. The only disturbance evident was a medium-sized root at 32–36 cm near the southern edge of the hearth. Artifacts from the feature matrix include 79 flakes, 1 miscellaneous uniface, 1 edge-modified flake, 1 limestone mano fragment, and 2 limestone metate fragments (at 30 and 34 cm) which fit together. Charcoal collected at 31–38 cm yielded a radiocarbon age of  $1630 \pm 40$  B.P. (Beta-102104, see Appendix A). In addition, one flotation sample collected from 31–38 cm contained charred remains of indeterminate wood (see Appendix E). Another processed flotation sample from 20–32 cm contained low frequencies of microdebitage and charred wood.

Although not assigned a feature number, the concentration of *Rabdotus* shells near Feature 2 could represent a cultural feature (see Figure 41). A similar concentration of snail shells at 41CV1106 may also be a cultural feature (see Cultural Features for 41CV1106).

Feature 4 would have been part of Analysis Unit 1, but this burned rock concentration was virtually destroyed by tank traffic between 1992 and 1996 (see Work Performed). This feature was not investigated in 1996.

### Discussion

Utilization of the area during the transition from the end of the Late Archaic period to the early Late Prehistoric period (Austin phase) is indicated by the calibrated charcoal radiocarbon date of A.D. 405 (425) 450 (see Appendix A) associated with Feature 2, along with diagnostic arrow and dart points (i.e., Scallorn, Darl, and Ensor). The assemblage associated with the intact hearth suggests an array of activities, including lithic reduction and gathering/processing of food resources. The presence of numerous ground stone tools (i.e., mano and metate fragments) is particularly notable. Charred pieces of hardwood from the hearth most likely represent a fuel

source. The bone fragments and mussel shells also represent subsistence-related hunting and gathering activities.

### Analysis Unit 2

Analysis Unit 2 subsumes the lower deposits from 60–138 cm in Test Unit 1 and from 0–50 cm in Test Unit 4. These deposits contain diagnostic projectile points and an intact burned rock midden.

### Cultural Materials

Some of the cultural materials from Test Unit 1 and all of the cultural materials from Test Unit 4 are associated with Analysis Unit 2 (Table 18). Levels 7–13 (60–130 cm) in Test Unit 1 produced 133 burned rocks (60.5 kg), 84 pieces of debitage, 1 miscellaneous uniface, 1 graver, 1 core, and 1 miscellaneous biface. In addition, a Pedernales point was recovered from 70–80 cm and a Dawson point was recovered from 80–90 cm. Level 14 (130–138 cm) yielded no cultural materials. Test Unit 4 consisted of Feature 1 from 0–48 cm, and each level produced cultural materials (see Cultural Features). From 48–50 cm, below Feature 1, the unit was culturally sterile.

### Cultural Features

Feature 1, a thick burned rock midden, was present in Test Unit 4 from the surface to a maximum depth of 48 cm. The entire feature matrix produced 1,131 burned rocks (201 kg), 64 flakes, 1 edge-modified flake, 1 miscellaneous biface, and 1 limestone metate fragment. One Pedernales and a Provisional Type I point were recovered at 10–20 and 20–30 cm, respectively (see Table 18). Levels 2 and 3 contained approximately 72 percent of all cultural materials from Test Unit 4. Charcoal collected from 30–40 cm yielded a radiocarbon age of  $3200 \pm 50$  B.P. (Beta-102103, see Appendix A). One processed flotation sample contained sparse amounts of microdebitage and charred wood, and no cultural or charred remains were observed in a second processed flotation sample. The vast majority of the burned rocks were angular fractured pieces, ranging from small chunks up to pieces 15x10x5 cm in size. No internal patterning was recognized. Burned rocks visible in all four walls of the test

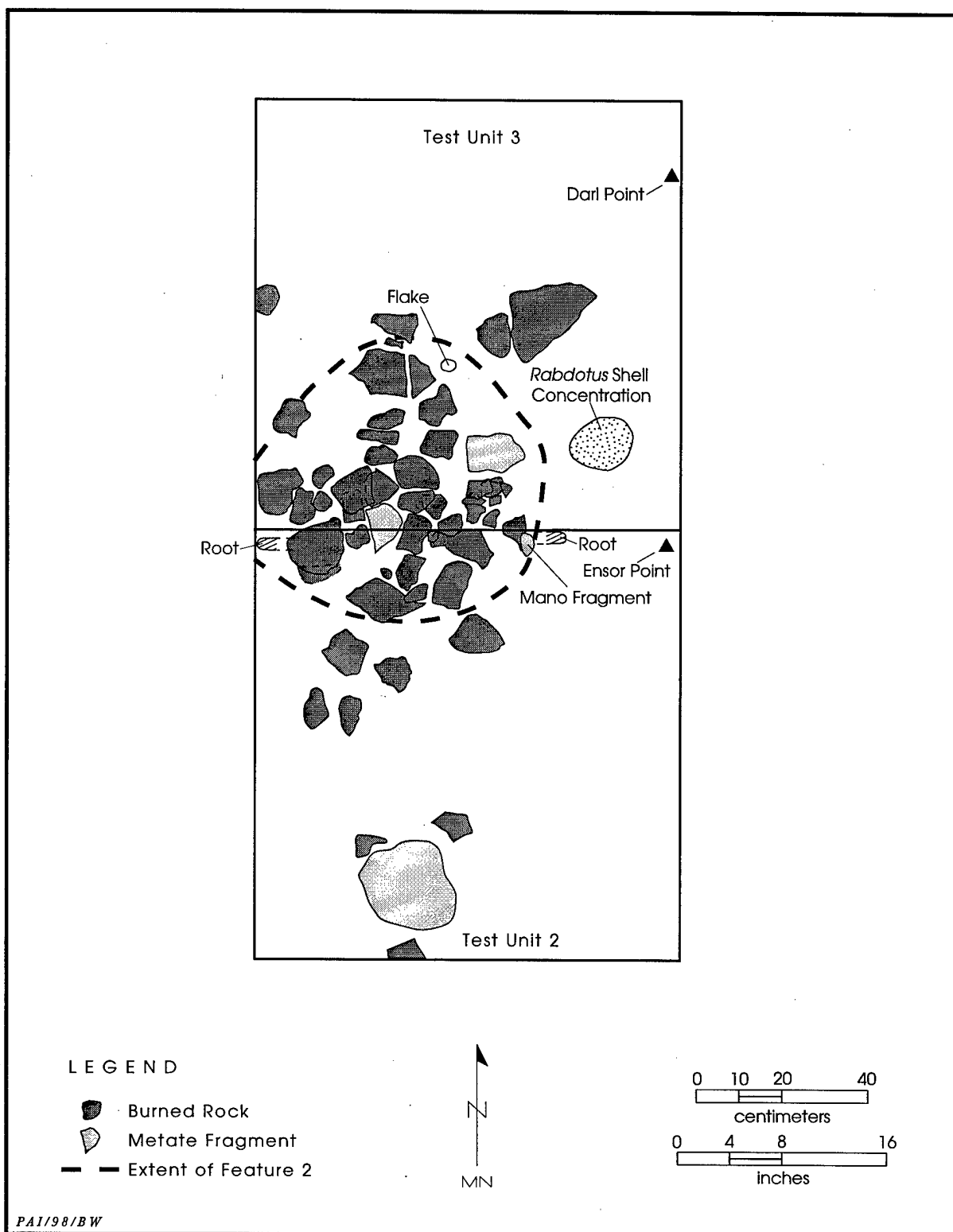


Figure 41. Plan of Feature 2 in Test Units 2 and 3, 41CV1191.

Table 18. Summary of cultural materials from 41CV1191, Analysis Unit 2

Provenience	Dart Points	Miscellaneous Bifaces	Miscellaneous Uniface	Graver/Burin	Edge-modified Flake	Core	Unmodified Debitage	Metate	Totals
<b>TEST UNIT 1</b>									
Level 7 (60–70 cm)	–	–	1	–	–	–	23	–	24
Level 8 (70–80 cm)	1	1	–	–	–	–	17	–	19
Level 9 (80–90 cm)	1	–	–	–	–	–	9	–	10
Level 10 (90–100 cm)	–	–	–	–	–	–	15	–	15
Level 11 (100–110 cm)	–	–	–	1	–	1	15	–	17
Level 12 (110–120 cm)	–	–	–	–	–	–	5	–	5
Level 13 (120–130 cm)	–	–	–	–	–	–	–	–	0
Level 14 (130–138 cm)	–	–	–	–	–	–	–	–	0
Subtotals	2	1	1	1	0	1	84	0	90
<b>TEST UNIT 4</b>									
Feature 1 (0–10 cm)	–	–	–	–	1	–	18	–	19
Feature 1 (10–20 cm)	1	1	–	–	–	–	24	–	26
Feature 1 (20–30 cm)	1	–	–	–	–	–	17	1	19
Feature 1 (30–40 cm)	–	–	–	–	–	–	5	–	5
Feature 1 (40–48 cm)	–	–	–	–	–	–	–	–	0
Level 5 (48–50 cm)	–	–	–	–	–	–	–	–	0
Subtotals	2	1	0	0	1	0	64	1	69
Totals	4	2	1	1	1	1	148	1	159

unit indicate that the feature extends beyond the unit in all directions. Due to the lack of exposures and dense vegetation, its overall size cannot be estimated. The feature exhibits no evidence of vandalism.

### Discussion

A calibrated charcoal radiocarbon date of 1510 (1440) 1415 B.C. (see Appendix A) from the lower portion of Feature 1 suggests that this midden began to accrete during the early part of the Late Archaic period. However, the recovery of a Pedernales and Provisional Type I point in apparent stratigraphic sequence above the dated zone of the midden renders the context dubious. The dated charcoal may have been reworked down through the feature or the midden deposits themselves may be mixed by pedoturbation, although the latter was not obvious. Alternatively, the Provisional Type I point could represent a collected item that was

later reused. Excluding one piece of ground stone, the entire assemblage consists of burned rocks and chipped stone artifacts which include both expedient and formal tools.

No discrete cultural components were encountered in Test Unit 1, excavated approximately 10 m upslope of the midden. However, Pedernales and Dawson points at 70–90 cm correlate to the same relative time periods indicated by the diagnostic points found in Feature 1.

### Analysis Unit 3

Analysis Unit 3 is defined as the gentle, north-facing slope on the southeast side of the tributary. This analysis unit includes the thin veneer of slopewash deposits derived from the Paluxy sand. Underlain by weathered bedrock, these sediments are present from the surface to a maximum depth of 50 cm in Test Units 5 and 6. One subsurface feature was encountered in both test units.

### **Cultural Materials**

Test Units 5 and 6 produced a total of 1 flake and 18 burned rocks (3kg), in addition to a flake associated with Feature 3 (see Cultural Features).

### **Cultural Features**

Feature 3 (a burned rock concentration) was encountered from 10–30 cm in Test Units 5 and 6. With the exception of the extreme northern edge of the units, the feature extends across both units and into the east, west, and south walls. It consists of one to two layers of burned limestone rocks ( $n = 224$ , 58 kg) ranging from small blocky fragments to tabular pieces (up to 15x15x3 cm). Approximately half of the rocks were laid horizontally, with the remainder resting at various angles in a haphazard fashion. One flake was recovered from the feature fill. A flotation sample collected from 10–30 cm in Test Unit 6 contained charred fragments of *Quercus* wood (see Appendix E).

### **Discussion**

Due to the absence of chronometric data or diagnostic artifacts, no temporal assignment can be attributed to this shallowly buried but intact cultural component. Given the variable nature of Paluxy deposits, the research potential of this portion of the site is considered good.

### **Summary and Discussion**

At 41CV1191, testing north of the tributary demonstrates the presence of two spatially discrete buried components (Analysis Units 1 and 2) in late Holocene-age sediments. Calibrated charcoal dates (see Appendix A) and diagnostic projectile points indicate that these occupations occurred during the early portion of the Late Archaic period (1510–1415 B.C.) and into the transition from the Late Archaic to Late Prehistoric period (A.D. 405–450). The symmetry of the deposits suggests that younger inset fills are present nearest the tributary and that the Glen Rose limestone undulates considerably. As evidenced by Test Units 1 and 4, underlying older occupations are represented along the tributary margins and appear contemporaneous with thinner deposits situated farther away from the channel. Although their contexts are tenuous,

Dawson and Provisional Type I points suggest that the area might have been utilized as early as the Middle Archaic period.

No temporal data were derived from the excavations southeast of the tributary (Analysis Unit 3). Nonetheless, the presence of an intact burned rock feature buried in Paluxy slopewash sediments demonstrates the presence of a single component in this portion of the site. In all likelihood, this component correlates with the Late Archaic to Late Prehistoric occupations across the tributary, but the archeological/stratigraphic context of this area has not been independently established.

The testing results demonstrate that 41CV1191 is a multicomponent site that contains valuable data based on the presence of stratigraphically separable features and occupational debris. Shell, bone, charred plant remains, and ground stone are indicative of hunting and gathering and processing of foodstuffs. Based on the foregoing, 41CV1191 is considered significant and is recommended as eligible for listing in the NRHP.

### **41CV1194**

#### **Site Setting**

Site 41CV1194 is situated on a colluvial slope and alluvial terrace on the north side of a tributary of Ripstein Creek. A heavily eroded military trail traverses the northeastern edge of the site and a small gully heads southward just beyond the eastern site margin. With the exception of an open grassy area along the eroded trail, the site is covered by dense oak brush intermixed with juniper trees. Site elevation is 315 m above mean sea level.

#### **Previous Work**

The site was initially recorded by Mehalchick (Texas A&M University) on 10 June 1986 as a high density burned rock and lithic scatter. Site dimensions were defined as 90 m north-south by 40 m east-west. The majority of artifacts, including debitage, unifacial tools, three dart points (collected), metate fragments, and a mano, were observed along a jeep trail. The site was estimated to be 50 percent disturbed by vehicular traffic and erosion, and the depth of sediments was noted to be less than

50 cm thick.

Frederick and Trierweiler (Mariah Associates) assessed the site in June 1992 on the basis of geomorphic observations and the potential for the site to contain intact cultural deposits. Site dimensions were altered to 80 m north-south by 60 m east-west. The site was observed to be situated on an interfluvial slope across the Paluxy and Walnut Formations. An A-R or A-C profile was observed within exposures of solum that were generally less than 50 cm thick. Just below and south of the site, a tributary floodplain contained much thicker deposits, possibly representing West Range alluvium (Nordt 1992). A burned rock concentration, possibly a mound or midden, was located on the slope. It was estimated to be 10 m in diameter with 10–20 cm of relief above the ground surface. The feature (Feature 1) was noted to be minimally disturbed by vehicular traffic and covered by dense brush.

Three shovel tests were excavated to test the potential for buried deposits. The first test, excavated to bedrock at 30 cm, was placed just downslope from the feature. Nine burned rocks were recovered. The second test was excavated to bedrock at 40 cm in the approximate center of the feature. A total of 17 burned rocks, 5 flakes, and a biface were recovered from 10–40 cm. The remaining test, placed upslope from the feature, was excavated to 40 cm. This test was sterile. Based on the results of shovel testing, the investigators concluded that the site had the potential for intact cultural deposits of unknown significance. A minimum formal testing effort of 2–3 m<sup>2</sup> of manually excavated test units was recommended to determine the NRHP eligibility of the site (Trierweiler, ed. 1994:A1338–A1340).

### Work Performed

In July 1996, Prewitt and Associates completed formal testing of 41CV1194. One backhoe trench and two 1x1-m test units were excavated. A total of 1.8 m<sup>3</sup> was manually dug (Figure 42). The previously observed burned rock concentration was not re-located.

Backhoe Trench 1 (25.0x0.8x1.8 m, oriented to 201°) was excavated from the front edge of the colluvial slope onto the lower floodplain. The trench was excavated to bedrock on the slope and to dense gravels on the terrace. A few shallowly buried burned rocks were observed in the upslope end of the trench, and a thin discrete

lens of a few burned rocks and a sparse amount of charcoal (Feature 2) was encountered at ca. 140–150 cm in the east wall of the downslope end of the trench. The trench profile was subsequently described and soil geomorphology was assessed.

Test Unit 1, excavated to dense gravels at 150 cm, was oriented with and placed along the east wall of Backhoe Trench 1 above Feature 2. Test Unit 2, excavated to bedrock at 30 cm and oriented to magnetic north, was placed in the area of the previously reported burned rock feature (Feature 1) where scattered burned rocks were exposed on the surface of the colluvial slope.

### Site Extent and Depth

Site 41CV1194 covers an area of 95 m north-south by 65 m east-west and encompasses two geomorphic surfaces, the tributary terrace and the colluvial slope, separated by a small escarpment (see Figure 42). Although few cultural materials were observed in the upper 150 cm of the terrace deposits in Backhoe Trench 1 and Test Unit 1, a fair number were found from 0–30 cm in the colluvial deposits excavated in Test Unit 2.

### Sediments and Stratigraphy

Within the terrace deposits, Backhoe Trench 1 revealed a 148+-cm-thick profile of very dark grayish brown loamy alluvium overlying a grayish brown gravelly silty clay loam alluvium. The alluvial sediments are imprinted with an A-Bwk-Ck soil profile. It is believed that the sediments are late Holocene in age based on the degree of soil development. They are probably equivalent to the West Range alluvium (Nordt 1992). The sediments on the colluvial slope consist of a thin drape of reworked Paluxy sands overlying Glen Rose limestone.

### Definition and Interpretation of Analysis Units

Analysis Units 1 and 2 were defined within 41CV1194 based on differing sediments and geomorphic surfaces. Analysis Unit 1 consists of the colluvial deposits on the slope. Analysis Unit 2 comprises the alluvial deposits underlying the terrace.

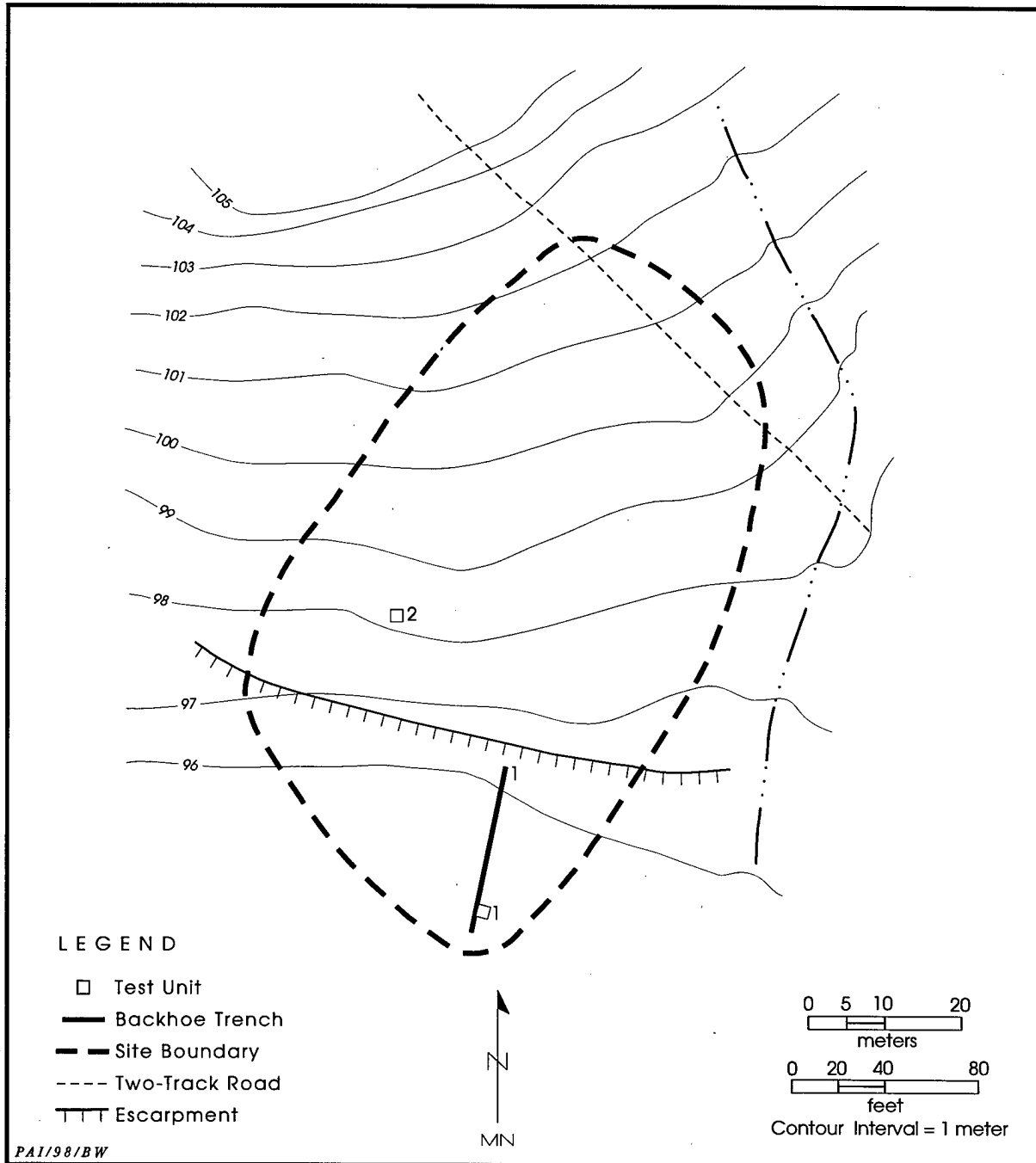


Figure 42. Site map, 41CV1194.

### Analysis Unit 1

#### Cultural Materials

All artifacts recovered from Test Unit 2,

including 12 flakes and approximately 300 (53.5 kg) burned rocks, are associated with Feature 1. A flotation sample was collected at 10–20 cm, and a single piece of charcoal was recovered at 20–30 cm.

### ***Cultural Features***

Although the current investigations did not find the 10-m-diameter burned rock feature observed in 1992, many angular pieces of thermally fractured limestone were sporadically scattered across the surface of the lower portion of the slope. Two military trails, now overgrown with vegetation, transect this portion of the site, and it appears that the Feature 1 seen in 1992 was subsequently disturbed. Based on the exposure of Feature 1 from 0–29 cm in Test Unit 1, it is interpreted as a deflated or disturbed burned rock midden. A number of cultural items (3 flakes and 90 [15.5 kg] burned rocks) were found from 0–10 cm, but peak recovery occurred from 10–20 cm, with 4 flakes and more than 170 (28.5 kg) burned rocks. The feature matrix flotation sample recovered from this level yielded no macrobotanical remains, but did contain a few mussel shell fragments. The majority of the matrix from 20–30 cm consisted of decayed bedrock, and artifact frequencies decreased notably to 5 flakes and 39 (9.5 kg) burned rocks. The burned rocks comprising the feature did not form any recognizable pattern and were located within the loosely compacted, reworked Paluxy sediments.

### ***Discussion***

Analysis Unit 1 consists of a colluvial slope with a thin mantle of reworked Paluxy sand overlying bedrock. Burned rocks are exposed sporadically along the front edge of the slope, but no intact features (e.g., burned rock mound) were identified. Although many burned rocks were recovered from Test Unit 2, Feature 1 appears to be redeposited and virtually no subsistence or macrobotanical remains were found.

### ***Analysis Unit 2***

### ***Cultural Materials***

Cultural materials recovered from Test Unit 1 include one flake and seven burned rocks, all of which are associated with Feature 2. A small charcoal sample and a flotation sample were collected from the feature matrix.

### ***Cultural Features***

Feature 2 is a burned rock concentration

which consisted of a single layer of seven (3.5 kg) burned rocks found within a 94x38-cm area at 137–148 cm along the west edge of Test Unit 1. The rocks are generally tabular, sloping toward the southeast across the unit. The western portion of the feature obviously was impacted during trenching, but no evidence of it was found in the opposite trench wall. Therefore, the overall dimensions of the feature are estimated at 85–95 cm in diameter. The feature was contained within a dense gravelly matrix. A small amount of charcoal was found directly below some of the burned rocks, but no macrobotanical remains were found in a feature matrix flotation sample. Only one flake was found in the surrounding matrix at 140–150 cm. The largest of the burned rocks comprising the feature measured 20x13x3 cm. No discernible pattern was apparent, and the burned rocks may represent the remains of a displaced or redeposited hearth.

### ***Discussion***

Analysis Unit 2 consists of a small section of the tributary terrace that contains deposits thought to be equivalent to the West Range alluvium (Nordt 1992). Backhoe Trench 1 was excavated into this fill, and a fairly discrete concentration of burned rocks (Feature 2) was discovered. Although this feature contained small amounts of charcoal, its context is questionable.

### ***Summary and Conclusion***

Site 41CV1194 is situated on a colluvial slope and terrace on the north side of a tributary of Ripstein Creek. Two burned rock features were found, but both appear to have been displaced or redeposited. Because no intact cultural deposits were encountered in the excavations and because virtually no subsistence evidence or datable organic remains were discovered, the site has an extremely limited archeological research potential. It is recommended that 41CV1194 be considered ineligible for listing in the NRHP.

### ***41CV1258***

### ***Site Setting***

Site 41CV1258 is situated on a south-facing slope of the intermediate Killeen surface

(Figure 43). Unnamed tributaries of House Creek are located to the northeast and southwest. Numerous tank trails crisscross the site area and several are severely eroded. A large portion of the surface is an open, grass-covered area, but dense stands of oak and juniper with

secondary undergrowth are present. Site elevation is 260 m above mean sea level.

### Previous Work

On 21 May 1986, Schweigert, Mehalchick,

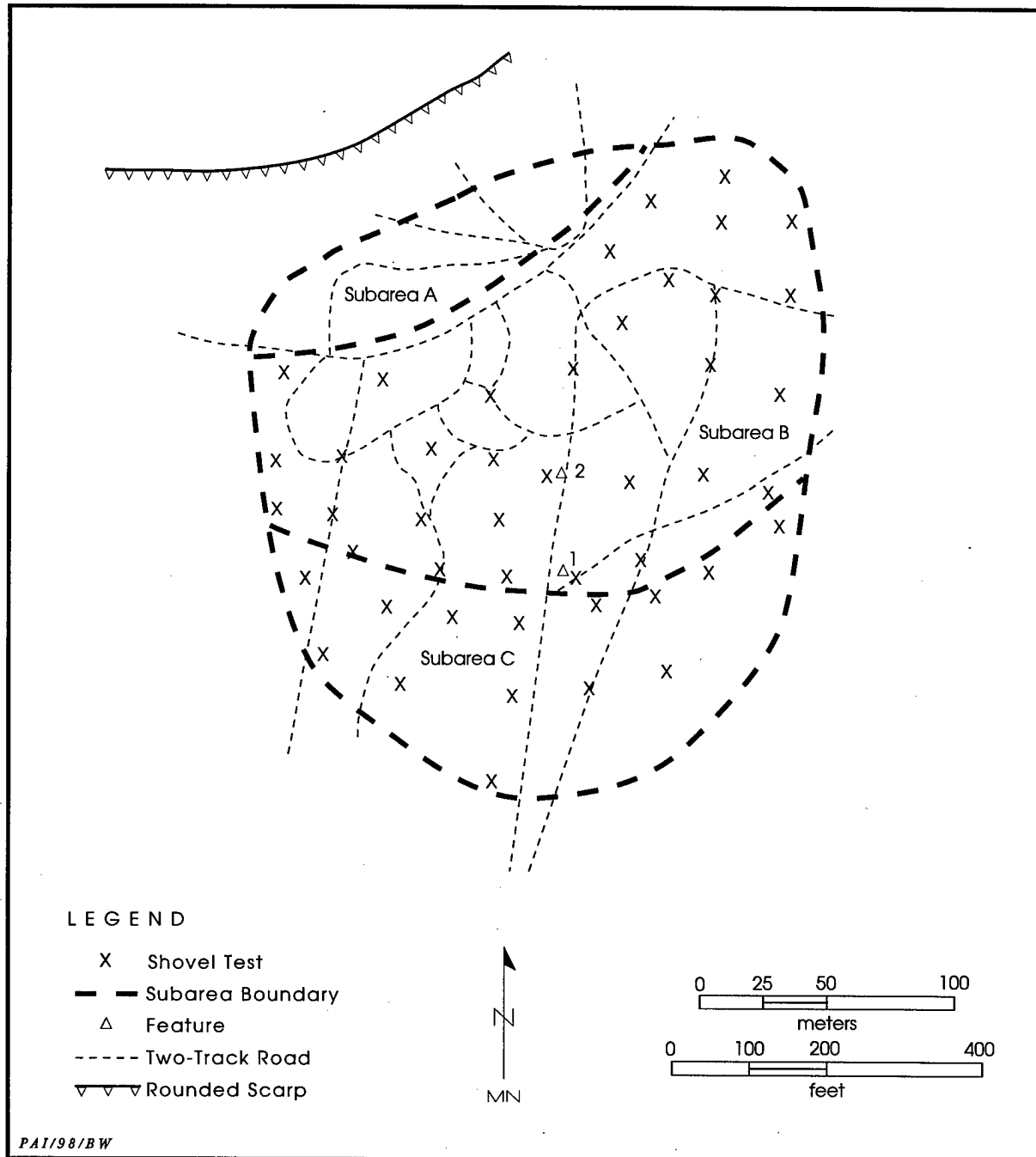


Figure 43. Site map, 41CV1258 (modified from Trierweiler, ed. 1994:A1398).



Davis, and Dureka (Texas A&M University) recorded the site. An extensive scatter (325x312 m) of burned rocks and lithic artifacts was noted, particularly in and along road cuts. One untyped dart point was collected. The investigators suggested that the site might have been a source for hematite and limonite, but they provided no explanation of this interpretation. The estimated depth of deposits was less than 1 m, but subsurface cultural deposits were thought to be present. An estimated 75 percent of the site was disturbed by vehicular traffic, erosion, cattle grazing, and military activity. For management purposes, the site was classified as a lithic resource procurement area (LRPA) because of its size.

On 24 November 1992, Turpin and Abbott (Mariah Associates) revisited the site. Exposed cultural materials indicated that maximum site dimensions were 260 m north-south by 240 m east-west. Based on archeological potential and geomorphic contexts, the site was divided into three subareas.

Situated on the upslope (north) end of the site, Subarea A consisted of bedrock limestone of the Walnut Formation and colluvium derived from this formation. The colluvium extended onto the outcrop of Paluxy sand downslope, but little or no soil development was evident. A thin surface scatter of debitage and burned rocks was noted. Since Subarea A exhibited severe erosion and lacked soil development, no further work was recommended.

Downslope on the Paluxy sand outcrop, Subarea B included very dark brown to very dark grayish brown sandy slopewash sediments that rested unconformably on a truncated, strongly developed soil. The buried soil consisted of a dark reddish brown Bt horizon that graded into a yellowish to tan Bk-K lower solum developed on the Paluxy sandstone. Two burned rock features, in addition to a scatter of burned rocks and sparse flakes, were observed, and one Castroville point was surface collected. Located at the south-central (downslope) margin of the subarea, Feature 1 (a burned rock concentration) was exposed along the edge of a roadcut. Burned rocks were visible in the upper 10 cm of deposits and extended approximately 3 m north-south. Visible in the same roadcut about 30 m north (upslope) of Feature 1, Feature 2 was a deflated burned rock concentration measuring 3 m in diameter. Since Subarea B had the potential for buried cultural deposits, shovel testing was

recommended.

On 17 December 1992, 32 shovel tests were excavated across Subarea B. Five of these yielded a total of 63 burned rocks and 1 flake. Each shovel test placed adjacent to Features 1 and 2 produced sparse to moderate amounts of burned rocks from 0–10 cm. One test excavated about 50 m northeast of Feature 2 contained numerous burned rocks and historic items from 10–55 cm. This subsurface feature (designated Feature 3) was either a severely disturbed prehistoric deposit or was historic in origin. Based on the shovel testing results, Subarea B was thought to contain intact cultural deposits of unknown significance. The recommended testing effort included 2–5 m<sup>2</sup> of manually excavated test units to determine NRHP eligibility (Trierweiler, ed. 1994:A1397–A1399).

Located at the downslope (southern) margin of the site, Subarea C was situated on the outcrop of the Glen Rose limestone. Here, a 30–40-cm-thick sheet of slopewash sediments derived from the Paluxy sands exhibited an A-Bt profile. Burned rocks were scattered on the surface and shallowly buried in the slopewash sediments. Since Subarea C had the potential for intact cultural materials, 14 shovel tests were excavated. Most encountered bedrock or the Bt horizon at 20 cm, and all were culturally sterile. Based on these results, Subarea C had extremely limited archeological potential and no further work was recommended.

On 9 April 1993, Abbott and Kleinbach (Mariah Associates) revisited the site to evaluate its potential for addressing questions of lithic procurement and reduction. No chert resource was observed on-site or in the immediate vicinity, so the site was excluded from the LRPA resurvey.

### Work Performed

On 23 October 1996, Prewitt and Associates completed formal testing of Subarea B at site 41CV1258 (Figure 44). The previously recorded burned rock concentrations, Features 1 and 2, were re-located and appear unchanged since their original recording. Initially, the test excavations consisted of six 1x1-m test units (Test Units 1–6), with a total of 5.3 m<sup>3</sup> manually excavated. In order to provide an extensive exposure of Paluxy sediments for interpreting depositional history, two oversized and odd-shaped backhoe trenches were subsequently excavated, examined, and

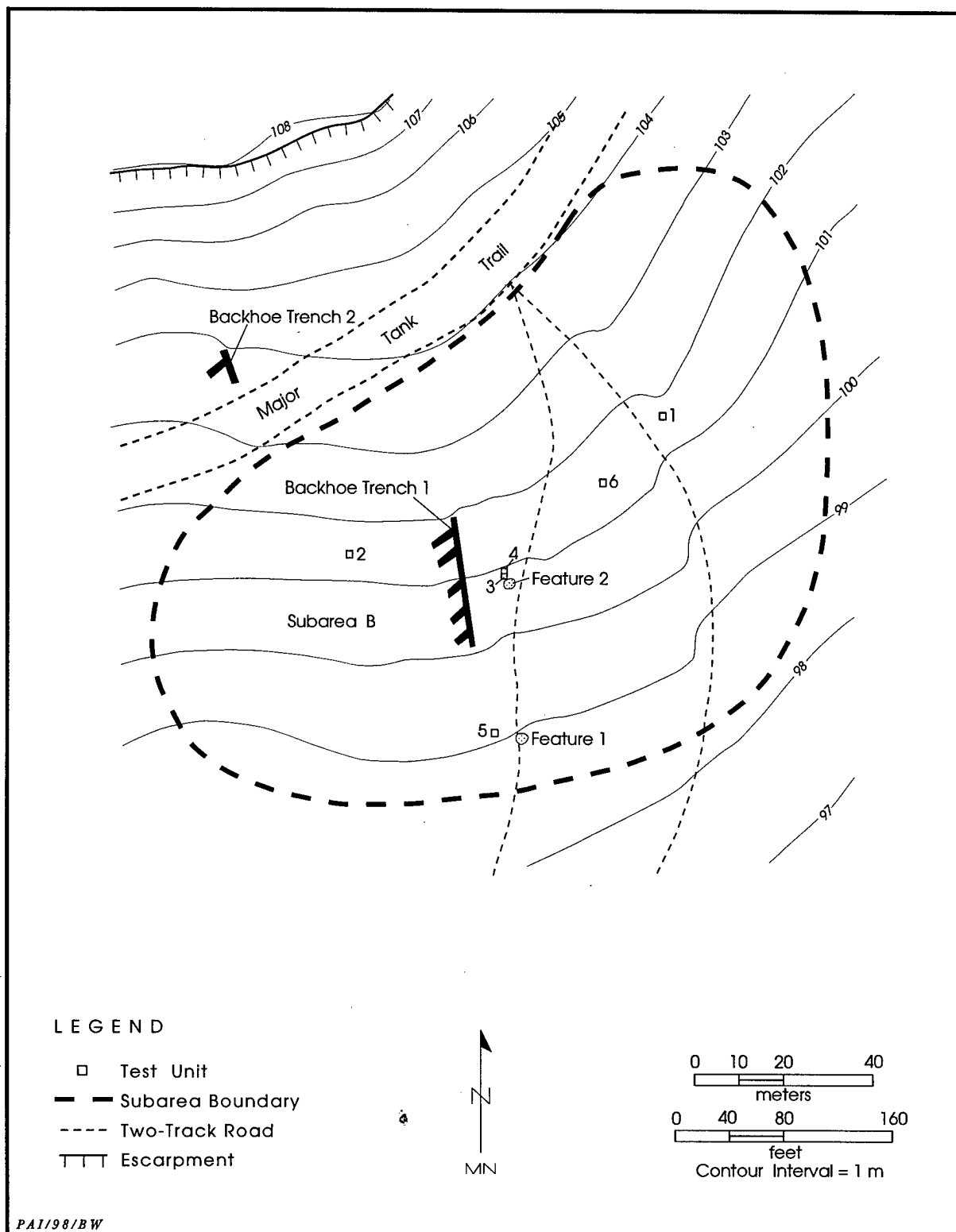


Figure 44. Map of Subarea B, 41CV1258.

sampled. Sedimentological analyses (i.e., grain-size, clay mineral, and petrographic analyses) were then conducted in order to interpret the depositional context of various sedimentary units (see Appendixes B and C). A detailed discussion of the sediment data and depositional history for 41CV1258 is presented in Chapter 5.

Located at the center of Subarea B, Backhoe Trench 1 was oriented to 350° and measured 30.0x0.8x1.8 m. Five 1-m-wide profiles along the east wall of Backhoe Trench 1 were described; these profiles were consecutively numbered 1–5 from the upslope to the downslope end of the trench. Short, perpendicular trenches were excavated opposite each profile to facilitate photo documentation. In addition, 13 sediment samples were collected from various proveniences along the east wall for sedimentological analyses.

Approximately 50–60 m upslope from Backhoe Trench 1, Backhoe Trench 2 was placed at the south-central margin of Subarea A specifically to provide an exposure of unweathered *in situ* Paluxy sand. Oriented to 332°, the trench had dimensions of 6.0x0.8x3.0 m. A 4-m-wide section of the east wall was described. Again, a perpendicular trench was excavated opposite the profile for ease of photo documentation. Samples of Paluxy sandstone were collected from the east wall at 160–166 cm and 252–258 cm for sedimentological analyses. In addition, a third sample was collected from the overlying Walnut Formation (0–52 cm) for sedimentological analyses.

Test Unit 1 was placed in the vicinity of the previously excavated shovel test which encountered Feature 3 from 10–55 cm. The test unit encountered weathered bedrock at 100 cm (maximum depth). Test Unit 2 was located 1.5 m northeast and just upslope of a small, deflated cluster of burned rocks exposed in a tank trail. Decomposing sandstone was encountered at approximately 50 cm along the west wall. At 80 cm, the size of Test Unit 2 was reduced to 40x40 cm, and its excavation was terminated at 100 cm when basal gravels were encountered. Test Unit 3 was excavated just upslope (northwest) of Feature 2 and just west of a tank trail. A moderate density of burned rocks was encountered at 20–30 cm; these were left *in situ*. Test Unit 4 was placed north of and contiguous to Test Unit 3 in order to further expose the burned rocks. Test Units 3 and 4 were then excavated simultaneously to a maximum depth of 130 cm

(i.e., the top of the late Pleistocene soil horizon). Placed a few meters west of Feature 1, Test Unit 5 was excavated to a late Pleistocene soil at 30 cm. Test Unit 6 was placed between Test Units 1 and 4. Excavated to a maximum depth of 140 cm, the base of this unit encountered densely packed, rounded sandstone gravels.

### Site Extent and Depth

The slope is delimited by the Walnut Formation to the north (upslope) and the Glen Rose limestone to the south (downslope). Although the Paluxy outcrop extends an unknown distance east and west, the surficial scatter of cultural materials and testing results indicate that the areal extent of the Subarea B cultural deposits is 175 m northeast-southwest by 100 m northwest-southeast. Four test units produced the densest amounts of cultural materials at 0–30 cm; however, some of the excavations also contained mixed deposits evidenced by intrusive modern or historic items. A probable hearth was encountered at 25–39 cm in Test Units 3 and 4.

### Sediments and Stratigraphy

Geomorphological investigations at site 41CV1258 revealed that the cultural materials and features are encapsulated in and/or rest upon late Pleistocene- and late-Holocene age colluvial and slopewash deposits (see Chapter 5). The underlying surface of the late Pleistocene colluvial unit undulates considerably and is gullied in places, thus causing the overlying mantle of late Holocene colluvium to vary in thickness across the site. These deposits also are pedogenically altered to varying degrees. The sandy colluvial and slopewash deposits are derived from the Lower Cretaceous Paluxy and Walnut Formations. An intact portion of the Paluxy Formation was observed in the profile of Backhoe Trench 2. The upper 52 cm of the profile is comprised of clay and limestone of the Walnut Formation. The underlying 304-cm-thick Paluxy deposit consists of yellow grading to white, very fine to fine quartz sand, which becomes slightly lithified with depth. Below the Paluxy Formation is the Glen Rose limestone.

The Paluxy-derived colluvial and slopewash deposits thin downslope across the site (see Figure 8). The late Holocene deposits are

particularly thick upslope and dramatically thin downslope, except where they fill gullies cut into the underlying deposits. In the upslope or northern end of Backhoe Trench 1, Profile 1 consists of 175 cm of late Pleistocene- and late Holocene-age sandy colluvium overlying a thin bed of Paluxy sandstone/quartzite and Glen Rose limestone. The late Holocene deposits are an 80-cm-thick dark yellowish brown to yellowish brown sandy loam imprinted with an A-Bw soil profile. They overlie a truncated late Pleistocene/Holocene soil exhibiting a 2Btb-2BCb profile. Downslope from Profile 1 is Profile 2, which consists of a 180-cm-thick late Pleistocene and late Holocene sandy colluvium overlying a thin, broken bed of Paluxy sandstone/quartzite and Glen Rose limestone. The late Holocene unit is a 132-cm-thick dark grayish brown to yellowish brown sandy loam imprinted with an A-Bk soil. It overlies a truncated late Pleistocene/Holocene 2BCb soil. Profile 3 consists of 142 cm of late Pleistocene and late Holocene sandy colluvium overlying Glen Rose limestone. The late Holocene unit is 75 cm thick and is imprinted with two soils. The surface soil consists of a dark grayish brown sandy loam A horizon and underlying strong brown sandy loam to sandy clay loam C horizon. The buried soil (2Ab horizon) within the late Holocene unit is a brown to dark brown sandy clay loam. The underlying late Pleistocene colluvium (75–142 cm) consists of a brown to dark brown sandy clay loam and strong brown sandy loam exhibiting a truncated 3Btb-3BCb soil.

Test Units 2, 3, 4, and 6 display thick upslope mantles of late Holocene colluvium. The 80+-cm-thick profile of Test Unit 2 consists of a late Holocene colluvium. The deposits are comprised of a dark grayish brown fine sandy loam overlying a brown loam. They are imprinted with an A-Bk soil profile. The profile of Test Units 3 and 4 is 120+-cm-thick and consists of late Holocene and late Pleistocene/Holocene colluvium. The late Holocene unit (0–105 cm) is imprinted with two soils (A-C-2Ab profile). Soil humates from the buried soil (71–81 cm) yielded a conventional radiocarbon age of  $2210 \pm 60$  B.P. (Beta-102107). The late Holocene deposits overlie a 15+-cm-thick truncated late Pleistocene/Holocene, yellowish red sandy clay loam soil (3Btbk horizon). The profile of Test Unit 6 consists of late Holocene colluvium and exhibits an A-Bw soil. The A horizon is a 56-cm-thick dark grayish brown fine

sandy loam. The underlying Bw horizon is a 66+-cm-thick brown to dark brown loam.

Thinner late Holocene mantles are exhibited downslope in Profiles 4 and 5 of Backhoe Trench 1 and in Test Unit 5. Profile 4 consists of a 128-cm-thick late Pleistocene and late Holocene sandy colluvial deposit overlying Glen Rose limestone. The late Holocene deposit is a 13-cm-thick very dark grayish brown sandy loam imprinted with an A horizon. It overlies a truncated late Pleistocene/Holocene, yellowish red to strong brown sandy clay loam 2Bt-2BC soil (13–128 cm). Profile 5, at the southern or down-slope end of Backhoe Trench 1, consists of a 25-cm-thick late Holocene very dark grayish brown sandy loam imprinted with an A horizon. The soil overlies a 73-cm-thick truncated late Pleistocene/Holocene yellowish red sandy clay loam 2Bt-2BC soil. The truncated soil rests on the Glen Rose limestone. The 28-cm-thick profile of Test Unit 5 consists of a late Holocene and late Pleistocene/Holocene colluvium. The late Holocene unit is a 21-cm-thick very dark brown loamy fine sand imprinted with an A horizon. It overlies a truncated late Pleistocene/Holocene dark reddish brown sandy clay loam soil (2Bt horizon).

### **Cultural Materials**

In Test Units 1–4, Level 1 (0–10 cm) consisted of disturbed deposits that produced historic or modern materials. Test Unit 1 contained 115 burned rocks (17.5 kg) from 0–30 cm, with 48.6 percent found at 10–20 cm. The majority were highly fragmented pieces less than 3 cm in size. No cultural materials were found from 30–100 cm.

Excluding a portion of Feature 4 in Test Unit 4 (see Cultural Features), Test Units 2, 4, and 6 produced no prehistoric cultural materials. In Test Unit 6, modern items were noted from 0–20 cm, and a trash pit filled with tin cans and eggshell fragments was present from 30–90 cm in the southeast corner of the unit.

Five of eight levels excavated in Test Unit 3 produced a total of one flake and 25 burned rocks (3.5 kg). Eight flakes and 12 small burned rocks (0.25 kg) were present at 0–20 cm in Test Unit 5, but Level 3 (20–30 cm) was culturally sterile.

### **Cultural Features**

Feature 4 (a probable hearth) was encountered at 25–39 cm in the northeast half of Test

Unit 3; it extended only 16 cm north into Test Unit 4. Its maximum excavated dimensions are 70 cm north-south by 68 cm east-west. No burned rocks were visible in the east wall profile of either test unit, and no evidence of this feature was exposed in the nearby roadcut. This suggests that the feature was entirely contained within Test Units 3 and 4, and it does not appear to be part of Feature 2 (a previously recorded burned rock concentration) exposed downslope in the adjacent road cut. Feature 4 consists of one to two layers of fossiliferous burned limestone ( $n = 22$ , 15.5 kg), all of which were tabular pieces (most averaging 15x15x3 cm). Approximately half of the burned rocks were angled, with most sloping toward the north. A few were cracked in place, and flecks of charcoal were interspersed. Charcoal from the feature yielded a radiocarbon age of  $1850 \pm 40$  B.P. (Beta-102106, see Appendix A). Once the burned rocks comprising the feature were removed, an animal burrow was apparent. The angled rocks may have resulted from this disturbance and the feature's integrity appears to have been compromised. No artifacts were found in the feature fill or the surrounding matrix during excavation. A processed flotation sample did not contain any cultural materials or charred remains.

### Discussion

Five of the six test units excavated in Subarea B at 41CV1258 indicate that the upper 10–20 cm of deposits are disturbed. Test Unit 1 was placed in the vicinity of Feature 3, a previously identified burned rock feature with associated historic artifacts that was buried at 10–55 cm. The initial assessment of Feature 3 was that it represented a severely impacted prehistoric feature or might be historic in origin. Test Unit 1 yielded numerous burned rocks at 0–30 cm and some historic artifacts at 0–10 cm. Although not formally designated a feature during testing, the cultural materials in Test Unit 1 may be associated with the previously recorded feature. Nonetheless, these results, in addition to the presence of a modern trash pit from 30–90 cm in Test Unit 6, reveal that even deeply buried deposits have been disturbed.

Although utilization of the area during the Late Archaic period is indicated by the calibrated radiocarbon date of A.D. 120–235 (see Appendix A), bioturbation of the sediments directly below

Feature 4 compromises its contextual integrity. Overall, the paucity of cultural materials found in the excavations, in addition to the complete absence of cultural materials in the subsequent mechanical excavation (Backhoe Trench 1), demonstrates that the cultural deposits are diffuse. Due to the extensive disturbances, the cultural deposits in Subarea B of 41CV1259 are recommended as not eligible for listing in the NRHP.

### 41CV1283

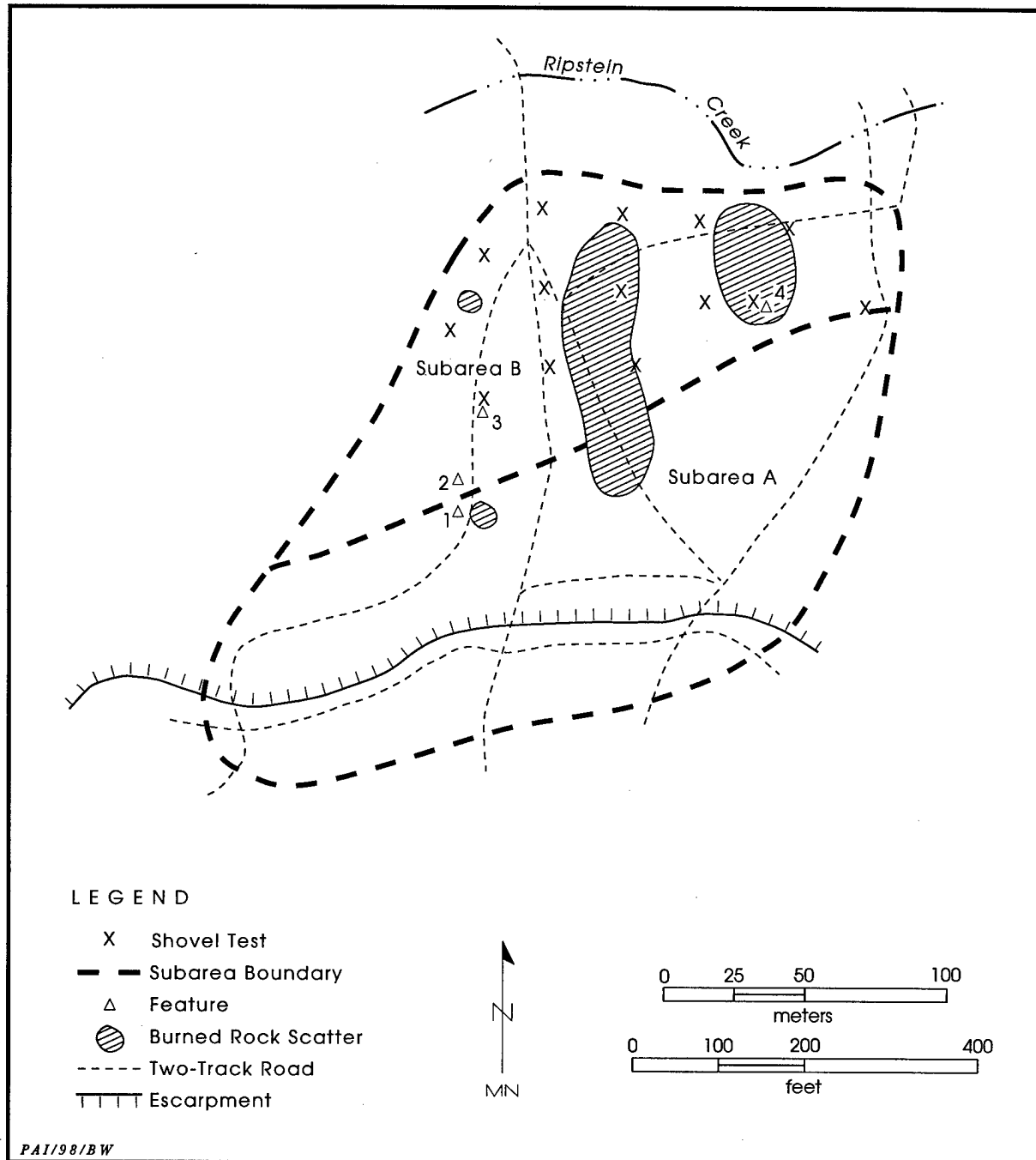
#### Site Setting

The site is situated on a north-facing colluvial slope south of Ripstein Creek (Figure 45). Wedged between the drainage and the upland surface, the site area is primarily open but covered with grasses and poison ivy. Several dense stands of juniper are present, along with isolated oak trees dotting the landscape. Site elevation is 290 m above mean sea level.

#### Previous Work

On 9 June 1986, Mehalchick (Texas A&M University) recorded the site. A moderate amount of burned rocks and an extremely sparse scatter of lithic artifacts were present across an area measuring 225x125 m; one untyped dart point was collected. An estimated 70 percent of the site was disturbed by erosion and vehicular traffic.

On 11 June 1992, Trierweiler and Frederick (Mariah Associates) reevaluated the site. Site size was expanded to 325x175 m based on surface exposures of cultural materials. Based on geomorphic contexts and archeological potential, the site was divided into Subareas A and B. Subarea A encompasses the southern half of the site, including the upland surface, the steep slope, and the upper portion of the colluvial slope. The upland surface and steep slope were extensively denuded and exhibited exposed limestone. The upper portion of the colluvial slope began at the contact between the Walnut and Glen Rose Formations where a 2–4-m-thick bed of Paluxy sand cropped out. A thin (less than 20 cm) A-Cox profile was developed in the Paluxy outcrop on the erosional colluvial slope. Lithic artifacts were scattered across Subarea A, with Feature 1 (a burned rock concentration) resting on bedrock. Since Subarea A lacked potential for intact



**Figure 45.** Site map, 41CV1283 (modified from Trierweiler, ed. 1994:A1425).

cultural deposits, no further work was recommended.

Subarea B includes the lower portion of the colluvial slope and extends down onto the  $T_2$  surface of Ripstein Creek. This area appeared to have minimal colluvial sedimentation during the

Holocene. A less than 30-cm-thick A-Cox to A-R soil profile formed within material weathered from the Paluxy Formation. Some of this sandy sediment appeared to have been transported downslope, resulting in the shallow burial of cultural features on the  $T_2$  surface. In this area,

the soils consisted of an A-Btk-K profile, with all but the A horizon clearly formed from the weathering of a late Pleistocene-age fill identified as the Jackson alluvium (Nordt 1992). Three burned rock features were identified. Features 2 and 3 were shallowly buried hearths exposed along a road cut in the western portion of the site. Feature 4, a partially deflated midden in the northeastern portion of the site, was approximately 10 m in diameter and 10–15 cm thick. Approximately 30 m downslope (north) of Feature 4, two Pedernales points, two untyped dart points, and a biface were surface collected. In addition, one biface was collected just west of Feature 4. Sparse amounts of debitage were scattered across Subarea B. Based on its high potential for buried cultural materials, shovel testing of Subarea B was warranted.

On 26 June 1992, a crew excavated 14 shovel tests in Subarea B, of which 6 (42.9 percent) were positive. Most of the cultural materials were found from 0–30 cm; however, one test in the north-central portion of the site produced 9 flakes and 1 burned rock from 20–48 cm. One shovel test adjacent to Feature 3 yielded 1 flake and 25 burned rocks at 20–30 cm. One test placed on Feature 4 produced 2 flakes and 21 burned rocks in Level 1, with bedrock encountered at 10 cm. Since Subarea B had the potential for intact cultural deposits of unknown significance, formal testing was recommended to determine NRHP eligibility. The recommended testing effort included a minimum of 4–6 m<sup>2</sup> of manually excavated test units (Trierweiler, ed. 1994: A1424–A1426).

#### Work Performed

On 20 August 1996, Prewitt and Associates completed formal testing of Subarea B at site 41CV1283 (Figure 46). Prior to excavation, Subarea B was surveyed to re-locate the previously identified features. Feature 2 was re-located and consisted of tabular burned rocks lying directly on bedrock. This probable hearth lacks contextual integrity. The location of Feature 3, another hearth, was found just downslope from Feature 2. Although no burned rocks associated with the feature were visible, the previously excavated shovel test adjacent to Feature 3 was discovered. Within a 30 m radius of the mapped location of Feature 4 (a midden), small but scattered accumulations of burned rocks were

observed in shallow deposits or on bedrock exposures (particularly at the downslope end). Nonetheless, no dense or discrete midden deposits were apparent. In general, thin deposits covered the majority of the subarea, with occasional exposed bedrock. One untyped dart point was collected from the surface. The test excavations in Subarea B consist of two 1x1-m test units; both were oriented to magnetic north. A total of 0.8 m<sup>3</sup> was manually excavated.

Placed perpendicular to a roadcut near the western edge of the site, Test Unit 1 was excavated ca. 40 cm east of the previously excavated shovel test which encountered Feature 3 at 20–30 cm. The unit was excavated to weathered late Pleistocene deposits at 40 cm. Placed in the northwest portion of the site, Test Unit 2 was excavated in the vicinity of another shovel test that contained buried cultural materials. Its excavation was terminated at 40 cm when the late Pleistocene-age deposits were encountered.

#### Site Extent and Depth

The colluvial slope comprising Subarea B is wedged between Ripstein Creek on the north and the upland surface to the south. Although the slope continues an unknown distance east and west, the previous investigations, exposed cultural materials, and testing results indicate that the areal extent of this subarea is ca. 240 m east-west by 85 m north-south. The excavations yielded cultural materials from the surface to a maximum depth of 30 cm; however, intact archeological deposits were not encountered.

#### Sediments and Stratigraphy

A profile of Test Unit 2 consists of a 20-cm-thick dark gray silt loam (A horizon) overlying a 14+-cm-thick yellowish brown silty clay (C horizon). It is believed that the A horizon has formed on a Holocene colluvium that encapsulates the cultural components at the site. The C horizon is probably late Pleistocene colluvium derived from the Paluxy and Walnut Formations.

#### Cultural Materials

Test Unit 1 produced a total of four burned rocks (0.50 kg), an edge-modified flake, and three flakes from 10–30 cm. Since no evidence of Feature 3 was encountered in the test unit, the

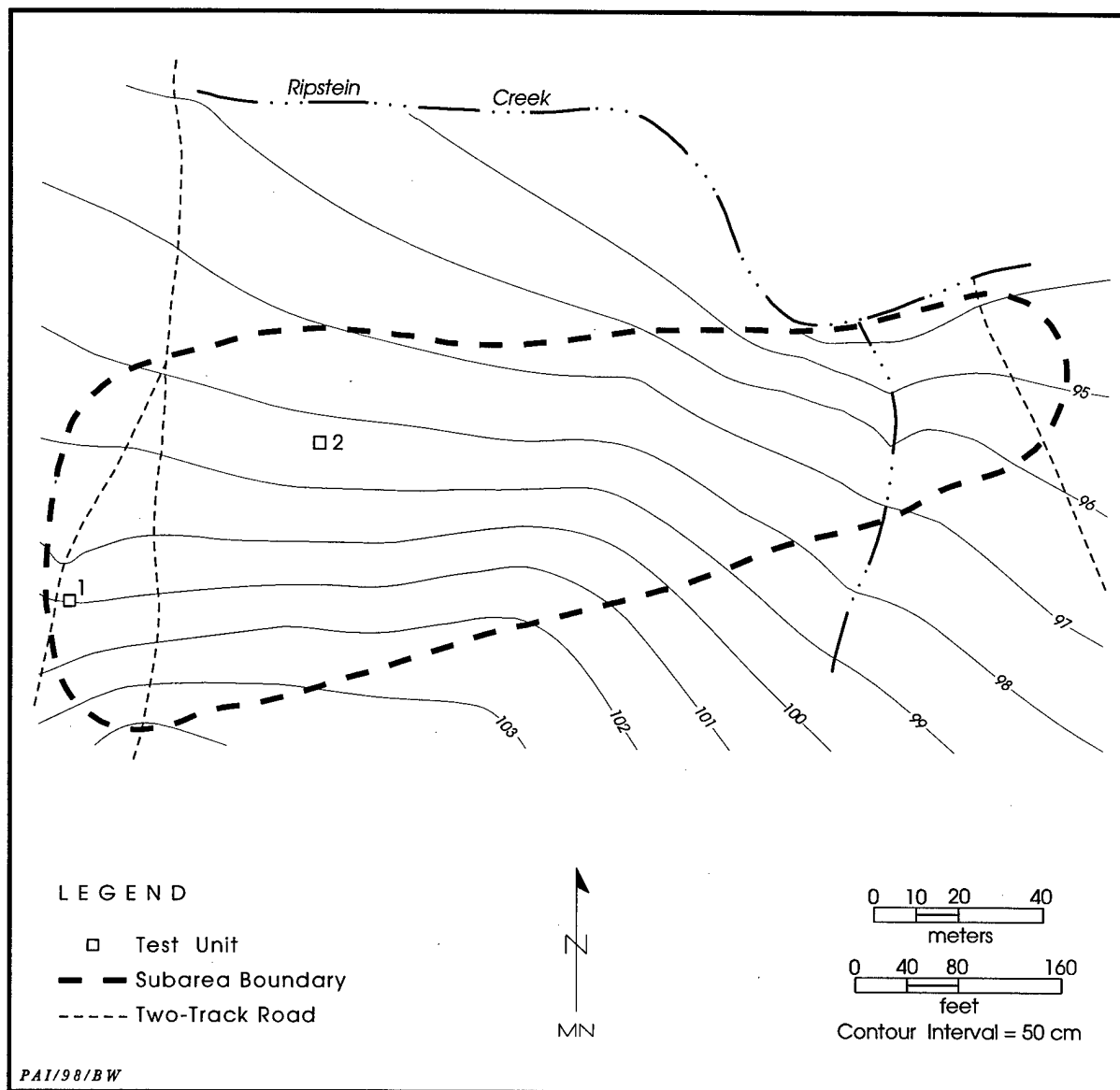


Figure 46. Map of Subarea B, 41CV1283.

narrow balk between the re-located shovel test and Test Unit 1 was excavated. Maximum dimensions of the balk were 45 cm north-south and 40 cm east-west. Encountered at 25–30 cm was a single layer of eight angular, horizontally laid burned rocks (0.5 kg). Most were small, averaging 5x5x3 cm. These rocks were considered to represent the edge of Feature 3, and they were confined to an area measuring 40 cm east-west by 30 cm north-south. No other evidence of the feature remained, and its overall size could not be estimated. No artifacts were recovered

from the feature fill.

Higher frequencies of cultural materials were found from 10–30 cm in Test Unit 2. Recovery included 121 pieces of debitage, 4 stone tools, and 27 small burned rocks (3.25 kg).

### Discussion

The combined results of shovel testing and formal testing, a visual reinspection of the area, and the absence of appreciable deposition confirm that previously identified features lack



contextual integrity. Although Test Unit 2 produced a high density of cultural materials from 10–30 cm, a stratigraphically isolable and intact component could not be identified. It is possible that many of the cultural materials encountered

were redeposited; these materials are encapsulated in colluvial sediments, and there is a notable absence of fine sediments upslope. Based on the foregoing, 41CV1283 is recommended as ineligible for listing in the NRHP.

# RESULTS OF TESTING AT HOUSE AND RIPSTEIN CREEK SITES

*Gemma Mehalchick, Karl Kleinbach, Karl W. Kibler,  
and Douglas K. Boyd*

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Fifteen sites located along House and Ripstein Creeks in the western portion of Fort Hood were tested (see Figure 2). This chapter describes the results of archeological testing at these sites, which consisted of 82 backhoe trenches and 75 test units (698 levels). Twenty-two analysis units were defined at these 15 sites (Table 19).

a scatter of mussel shells, flakes, bifaces, and unifaces, were noted. One Travis point was collected. Measuring 35x30 m, an estimated 60 percent of the site was disturbed by vehicles and vandalism.

On 23 May 1986, Davis, Dureka, and Frye

## 41CV578

### Site Setting

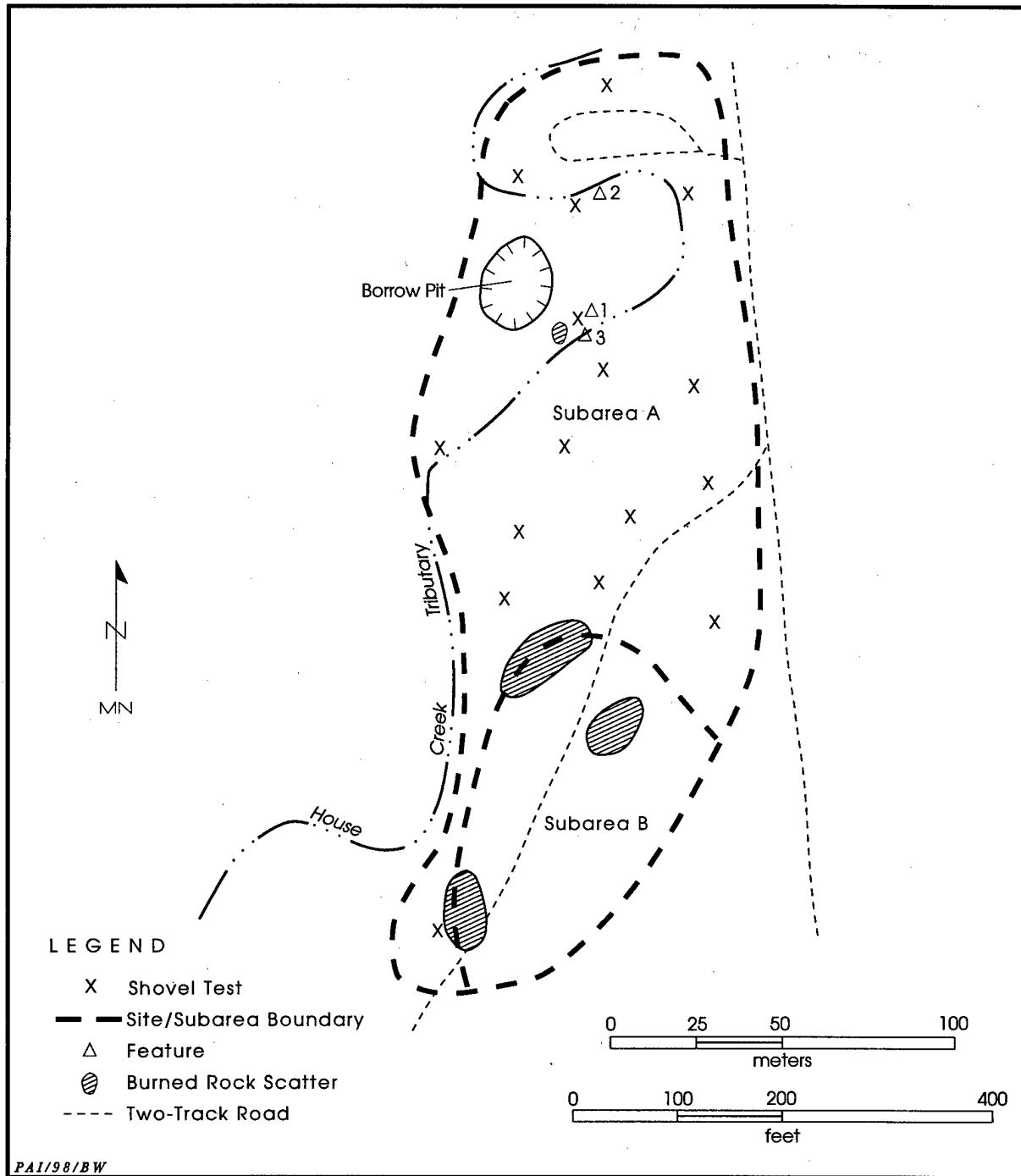
Situated on a series of terraces south of House Creek, 41CV578 straddles an unnamed tributary (Figure 47). The cutbank along the drainage is sloping to vertical, and up to 5 m tall. The majority of the site is open and covered with grasses, and a major tank trail delimits the eastern site boundary. Other vegetation along the drainage consists of an oak-juniper-cedar elm woodland with a thick understory. Site elevation is 235 m above mean sea level.

### Previous Work

On 8 November 1982, Thomas (Texas A&M University) described the site as a burned rock midden located east of a tributary of House Creek. Dense amounts of burned rocks, in addition to

**Table 19. Summary of analysis units defined at House-Ripstein Creek sites**

Site	Subarea Tested	Analysis Unit	Analysis Unit Setting
41CV578	A	1	terrace (T <sub>1</sub> )
		2	terrace (T <sub>1</sub> )
		3	colluvial wedge
41CV1211	-	1	terrace (T <sub>0</sub> )
		2	terrace (T <sub>1</sub> )
41CV1218	-	1	terrace (T <sub>2</sub> )
41CV1219	B	1	terrace (T <sub>1</sub> )
41CV1221	A	1	terrace (T <sub>0</sub> -T <sub>1</sub> )
	B	2	terrace (T <sub>2</sub> )
41CV1222	-	1	terrace (T <sub>0</sub> )
		2	terrace (T <sub>1</sub> )
41CV1225	A	1	terrace (T <sub>1</sub> )
41CV1235	-	1	toeslope/terrace (T <sub>1</sub> )
		2	toeslope/terrace (T <sub>1</sub> )
41CV1250	B	1	terrace (T <sub>10</sub> )
		2	terrace (T <sub>11</sub> )
41CV1269	A	1	toeslope/terrace (T <sub>1</sub> )
		2	toeslope/terrace (T <sub>1</sub> )
41CV1275	B	3	slope/bench
		1	terrace (T <sub>1</sub> )
		2	terrace (T <sub>1</sub> )
		3	terrace (T <sub>1</sub> )
41CV1282	C	4	terrace (T <sub>1</sub> )
		1	terrace (T <sub>1</sub> )
		1	toeslope
		2	terrace (T <sub>1</sub> )
41CV1287	A, B, C	1	slope/bench/toeslope/terrace
41CV1308	B	1	terrace (T <sub>1</sub> )



**Figure 47.** Site map, 41CV578 (modified from Trierweiler, ed. 1994:A951).

(Texas A&M University) rerecorded the site and expanded its dimensions to 175x100 m. It consisted of an open camp containing burned rock scatters and a light amount of debitage and mussel shells. Most of the burned rocks were

exposed in a jeep trail and along the tributary. Approximately 45 percent of the site was impacted by vehicular traffic, erosion, and possible vandalism.

On 29 December 1992, Mehalchick and

Frederick (Mariah Associates) revisited the site. The site was expanded to 250x100 m to include cultural materials and probable features visible in the tributary cutbank and on the terrace surfaces east and west of the drainage. Based on geomorphic contexts and archeological potentials, the site was divided into Subareas A and B.

Subarea B subsumed the  $T_2$  surface, which was underlain by an old alluvial fill consisting largely of gravels. The deposit exhibited an A-Bk-C profile, suggesting that the fill was correlative with the Jackson alluvium (Nordt 1992). Scattered burned rocks and debitage were noted on the surface. The area was severely impacted by erosion and military activity. Due to the lack of contextual integrity, no further work was recommended.

Subarea A included the  $T_1$  surface 5–6 m above the channel and the  $T_0$  surface 3–4 m above the thalweg. Multiple alluvial fills were present beneath the  $T_1$  surface. The majority of this surface appeared to be underlain by the lower West Range alluvium, which was more gravelly than the inset fill interpreted as the upper West Range. Both of these deposits exhibited A-Bw-C or A-Bk-C soil profiles. Observed in the upper West Range alluvium were two burned rock features (Features 1 and 2), isolated flakes and burned rocks at 10, 30, and 200 cm in the tributary cutbanks, and two tabular burned rocks at 25–30 cm along the edge of a foxhole. Exposed at an average depth of 30 cm in the west cutbank of the tributary, Feature 1 (a 100-cm-long by 15-cm-thick burned rock concentration) consisted of numerous burned rocks and *Rabdotus* shells. Feature 2 was buried at approximately 200 cm in the south cutbank. Comprised of large, tabular pieces of burned limestone, this probable hearth measured 40–50 cm long and 10 cm thick. Shallowly buried burned rocks also were found draping the unconformity between the upper and lower West Range fills.

A thin wedge of Ford alluvium draped the leading edge of the  $T_1$  surface and comprised the bulk of the deposits within the  $T_0$ . Pedogenic alteration of this deposit was minimal (A-C profile) or absent. No prehistoric cultural materials were observed within the Ford alluvium. Disturbances included erosion, military activity, roads, and borrow pits. Based on the presence of intact cultural deposits in the upper West Range alluvium and the potential for buried cultural

deposits in the Ford alluvium, shovel testing of Subarea A was warranted.

On 12 January 1993, a crew excavated 16 shovel tests in Subarea A. Four (25 percent) were positive and yielded debitage, burned rocks, and mussel shells from 10–50 cm. At this time, another burned rock feature was discovered in the west cutbank of the tributary. Located about 10 m south (upstream) of Feature 1, Feature 3 was a basin-shaped hearth consisting of angular and tabular burned rocks. It was buried at approximately 130 cm and measured 70 cm long and 20 cm thick. One flake was observed within the feature fill. Shovel testing results and the presence of buried features in the tributary cutbank indicated that Subarea A contained intact cultural deposits. The deposits were of unknown significance and were considered potentially eligible for listing in the National Register of Historic Places (NRHP). The recommended testing effort included four backhoe trenches and 6–10 m<sup>2</sup> of manually excavated test units (Trierweiler, ed. 1994:A950–A952).

### Work Performed

Prior to beginning excavations, the site area was resurveyed. Burned rocks were visible along the edge of a foxhole west of the tributary. The three previously recorded burned rock features exposed in the tributary cutbanks were re-located and appeared to be in the same condition as when first recorded. A charcoal sample was collected from Feature 3 (hearth) at 120 cm. Although this sample was submitted for radiocarbon dating, it did not contain enough carbon to be analyzed. About 15 m north of Feature 3, scattered cultural materials were observed in the upper 30 cm of cutbank deposits.

On 19 August 1996, Prewitt and Associates completed formal testing of 41CV578, Subarea A (Figure 48). The test excavations included five backhoe trenches (Backhoe Trenches 1–5) and four test units (Test Units 1–4), all of which were located on the  $T_1$  surface. Each test unit measured 1x1 m, except Test Unit 3 which had dimensions of 1.5x1.0 m. Test unit excavations were arbitrarily terminated at various depths ranging from 120–150 cm, with a total of 7.0 m<sup>3</sup> manually excavated.

Backhoe Trench 1 was excavated within a distinct meander west of the tributary and between the locations of Features 1–3. Oriented

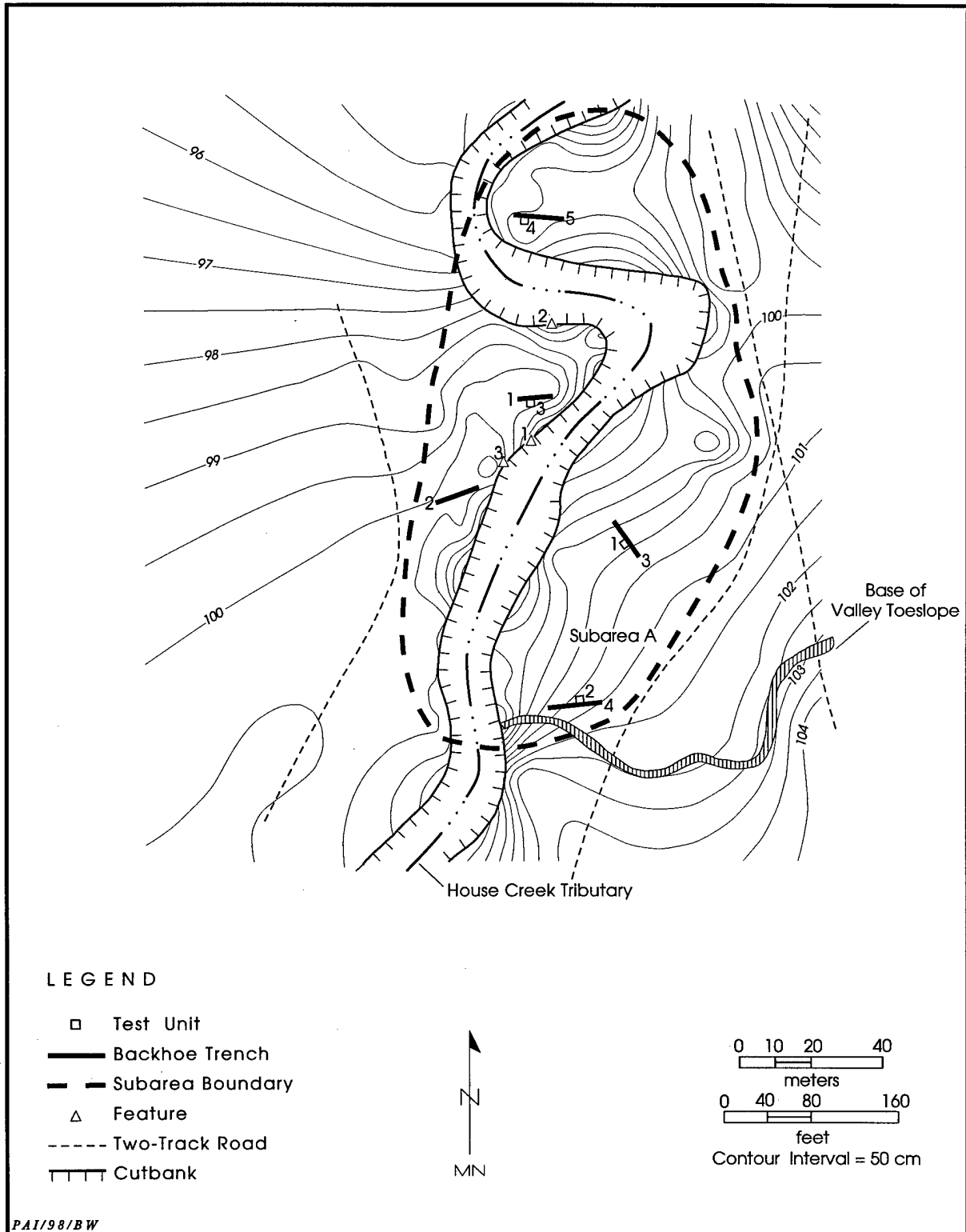


Figure 48. Map of Subarea A, 41CV578.

to 83°, the trench had maximum dimensions of 16.5x0.8x3.15 m. A burned rock feature was exposed in the south wall at ca. 100 cm. Scattered burned rocks and mussel shells were observed between 80 and 100 cm. Located along the south wall of the trench, Test Unit 3 was placed above the feature (Feature 7) visible at 100 cm. The test unit measured 1.5 m east-west in order to expose the entire burned rock lens and a portion of the surrounding area. Excavation was halted at 120 cm.

Placed ca. 30 m southwest of Backhoe Trench 1 and just southwest of Features 1 and 3, Backhoe Trench 2 was oriented to 254° and measured 12.5x0.8x2.9 m. Isolated burned rocks were noted at approximately 76 and 264 cm. Charcoal associated with the lowermost burned rocks was collected. The sample was submitted for radiocarbon analysis but did not yield sufficient carbon for dating.

Oriented to 320°, Backhoe Trench 3 (11.5x0.8x2.9 m) was placed 10–15 m southeast of the tributary on the terrace opposite Features 1 and 3. A burned rock feature was exposed at 120–130 cm in the west wall. Excavated to 150 cm, Test Unit 1 was placed adjacent to the west wall of the trench above the feature (Feature 5).

Approximately 40 m south of Backhoe Trench 3 and 25 m east of the tributary, Backhoe Trench 4 was excavated 10–15 m north of the downslope margin of Subarea B (i.e., the leading edge of the T<sub>2</sub> surface). The trench measured 16.0x0.8x1.6 m and was oriented 264°. From 0–50 cm, burned rocks, debitage, mussel shells, and snail shells were exposed in the trench walls. In the north wall, a lens of burned rocks was noted at about 65 cm. One untyped dart point and a Baird point made of nonlocal chert were collected from the backdirt pile. The imported chert is heat-treated, fine-grained, and pale brown speckled with numerous small black-and-white inclusions. Although its source has not been confirmed, a similar material is known to occur in the vicinity of Waco (Elton R. Prewitt, personal communication 1997). One reworked Darl point was recovered at 48 cm from the south wall of Backhoe Trench 4. Test Unit 2 was situated along the trench's north wall where a burned rock lens (Feature 6) was visible at 65 cm. The excavation was terminated at 120 cm.

Excavated within a distinct meander east of the tributary, Backhoe Trench 5 was located near the northern boundary of Subarea A, clos-

est to House Creek. Oriented to 272°, the trench had maximum dimensions of 10.0x0.8x2.7 m. Two lenses of burned rocks were exposed in the south wall at approximately 105 and 120 cm. From the south wall near the west end of the trench, charcoal associated with burned rocks was collected at 122 cm. In addition, burned rocks were scattered between 75 and 175 cm. Test Unit 4 was placed along the south wall of Backhoe Trench 5 above the two features (Features 8 and 9). The upper 15 cm of this unit consisted of a compacted, modern fill imported as gravel road base; this sediment was removed and not screened. Thus, the test excavation began with Level 2 from 15–20 cm and continued to an arbitrary stopping point at 250 cm.

### **Site Extent and Depth**

East of the tributary, the site area is bordered on all sides by natural and manmade landmarks. Starting at the northern boundary and continuing in a clockwise direction, the site is delimited by House Creek, a major tank trail, the higher T<sub>2</sub> surface, and the unnamed tributary. West of the tributary, only House Creek and the drainage delineate the site boundaries (to the north and east, respectively). The terraces continue an unknown distance south and west. Based on the exposure of cultural materials and the testing results, the horizontal extent of the site is 265 m north-south by 95 m east-west. Six intact burned rock features were encountered between 23–34 cm and 124–142 cm in the test units. In addition, three additional burned rock features were exposed at approximately 30, 130, and 200 cm in the tributary cutbank. Based on the foregoing, the vertical extent is represented by multiple occupations buried between 23 and 200 cm. The West Range and Ford alluvium noted by previous investigators was observed during this investigation. In addition, deeper deposits of Fort Hood alluvium also were identified.

### **Definition of Analysis Units**

Three analysis units are herein defined based on the presence of intact, temporally discrete occupations and different depositional units. Buried in the West Range and Fort Hood alluvium, Analysis Units 1 and 2 correlate to separable time periods. Although Analysis Unit 3 may be contemporaneous with Analysis Unit 1, the

stratigraphic unit encompasses a late Holocene-age colluvium.

### Analysis Unit 1

Analysis Unit 1 corresponds to the Late Archaic period and encompasses all deposits in Backhoe Trench 5 and Test Unit 4. These excavations exposed Ford alluvium to 85 cm and the underlying West Range alluvium from 85–265 cm, but the latter continues below that depth. Although this analysis unit subsumes both depositional units, all of the cultural materials were present at and below the contact of the two alluvial fills. Two discrete, intact features were encountered at 104–117 cm and 123–139 cm.

### Sediments and Stratigraphy

The 265-cm-thick profile of Backhoe Trench 5 consists of a 10-cm-thick cap of artificial fill overlying Ford and upper West Range alluvium. The Ford sediments (10–85 cm) are a drape of alluvium on the lower edge of the T<sub>1</sub> and are imprinted with a dark loamy A-ABk soil profile. The underlying upper West Range alluvium (85–265+ cm) is an upward-coarsening unit of loamy, sandy, and gravelly deposits. The gravelly deposits from 85–180 cm encapsulate cultural materials and features. The unit exhibits a 2Bwk-2Bwk2-2C soil profile.

### Cultural Materials

No cultural materials were found in the

upper 80 cm in Test Unit 4. From 80–130 cm, the unit produced 101 burned rocks (12.95 kg), 66 flakes, and 12 lithic tools including an untypeable dart point and a two-beveled knife (Table 20). Approximately 92 percent of the cultural materials were found from 90–120 cm, and most of these items are probably associated with Features 8 and 9 (see Cultural Features). From 130–250 cm, Level 18 (170–180 cm) contained only 1 flake.

### Cultural Features

Encountered at 104–117 cm, Feature 8 (an amorphous burned rock concentration) consisted of two to three rock layers (n = 49, 17 kg). Approximately 60 percent of the rocks were fist sized and angular, with most of the remaining pieces being medium sized and tabular. One 17x14x3 cm slab was cracked into two pieces; no other rocks were broken in situ. A few rocks were slightly angled, but the majority were laid horizontally. The maximum excavated dimensions are 100 cm north-south and 82 cm east-west. Burned rocks visible in the south and west walls of Test Unit 4 indicate that the feature extends an unknown distance in these directions; no overall dimensions could be estimated. Charcoal flecking was observed in the feature matrix, but no cultural materials were recovered from the fill. One processed flotation sample contained a very low frequency of charred wood. No evidence of disturbance was encountered.

At 123–139 cm, Feature 9 (a hearth) was contained primarily in the central portion of Test

Table 20. Summary of cultural materials from 41CV578, Analysis Unit 1, Test Unit 4

Provenience	Dart Point	Late-stage/ Finished Biface	Miscellaneous Biface	Miscellaneous Unifaces	Edge-modified Flakes	Unmodified Debitage	Totals
Level 9 (80–90 cm)	—	—	—	—	1	3	4
Level 10 (90–100 cm)	1	—	—	—	4	36	41
Level 11 (100–110 cm)	—	1	1	—	2	16	20
Level 12 (110–120 cm)	—	—	—	1	—	10	11
Level 13 (120–130 cm)	—	—	—	1	—	1	2
Level 18 (170–180 cm)	—	—	—	—	—	1	1
Totals	1	1	1	2	7	67	79

Unit 4 (Figure 49). The maximum excavated dimensions were 90 cm north-south and 86 cm east-west. No burned rocks were visible in the test unit walls or in the trench wall opposite (north of) the test unit. Based on these observations and the probability that trenching removed part of the feature, the estimated feature size is 160 cm north-south by 90 cm east-west. The hearth consisted of two layers of burned rocks (n = 60, 32 kg) ranging in size from 4x3x2 cm to 20x15x5 cm. Approximately 60 percent of the rocks were fist-sized and smaller angular pieces. The remainder were medium-sized and larger slabs, and several were cracked in situ. Most

rocks were laid horizontally, with six slabs slightly angled in various directions. No basin shape was apparent in the trench profile or in the feature cross section. No artifacts were recovered from the feature fill, but three pockets of charcoal preserved underneath the burned rocks were collected. Also, an 8x7x2-cm area of oxidized soil was observed near the southeast corner of the hearth. Charcoal collected at 134–135 cm was identified as *Quercus* wood and yielded a radiocarbon age of  $1480 \pm 40$  B.P. (Beta-102128, see Appendixes A and E). In addition, a flotation sample collected at 123–139 cm yielded charred macrobotanical remains of *Quercus* and

*Ulmus* wood, an indeterminate hardwood, *Carya illinoensis* fragments, indeterminate thin and thick nutshell fragments, and indeterminate fruit parts (see Appendix E).

### Discussion

Buried in the West Range alluvium, two discrete burned rock features are separated by 6 cm of matrix. The lower hearth (Feature 9) indicates utilization of the area during the Late Archaic period based on the calibrated charcoal radiocarbon date of A.D. 560 (605) 635 (see Appendix A). This hearth also yielded charred oak and elm wood in addition to fragments of fruit, pecan shell, and possibly walnut shell. A moderate density of lithic artifacts, including formal and expedient tools, is associated with both features.

### Analysis Unit 2

Correlating to the Middle Archaic period, Analysis Unit 2 includes all deposits in Backhoe Trenches 1, 2, and 3 and Test Units 1 and 3. These excavation units encompass the West Range and Fort Hood alluvium from the surface to a maximum depth of 315 cm. Both depositional units are present, but the



Figure 49. View to the south of Feature 9 in Test Unit 4, 41CV578.



contact between them is obscure. Two isolable features were buried at 93–108 cm and 124–142 cm.

### ***Sediments and Stratigraphy***

The profile of Backhoe Trench 2 was described in detail (see Appendix B); its 292-cm-thick profile consists of upper West Range and Fort Hood alluvial units. Although the upper West Range unit is believed to be a relatively thin drape (less than ca. 50–60 cm) mantling the terrace surface, no contact between it and the underlying Fort Hood unit can be discerned due to the degree of pedogenic development. The backhoe trench profile exhibits an A-Bwk-Bwk2-C soil. Although a boundary between the units cannot be clearly delineated, it is clear the majority of the cultural materials and features are encapsulated in the yellowish brown to yellow loamy Fort Hood deposits.

### ***Cultural Materials***

In Test Unit 1, sparse cultural materials were found from 0–50 cm, including recent intrusive items from 30–50 cm. From 50–150 cm, 7 of the 10 excavated levels produced 5 small burned rocks (1 kg), 13 flakes, and 4 lithic tools including a dart point barb (Table 21). Slightly more than half of these items were found from 120–140 cm and are associated with Feature 5 (see Cultural Features).

Each level from 0–110 cm in Test Unit 3 contained sparse to moderate amounts of cultural materials. Total recovery of 53 burned rocks (6.35 kg), 39 pieces of debitage, 2 edge-modified flakes, 2 unmodified mussel shells, 5 vertebrate bone fragments (see Appendix D), and 1 Darl point at 20–30 cm (see Table 21). Level 12 (110–120 cm) was culturally sterile.

### ***Cultural Features***

Feature 5 (a hearth) was present from 124–142 cm in Test Unit 1. Confined to the west-central portion of the test unit, this clearly delineated hearth had maximum excavated dimensions of 68 cm north-south by 47 cm east-west (Figure 50). Since no burned rocks were visible in the east wall of Backhoe Trench 3, opposite the test unit, the estimated dimensions are 70x68 cm. The hearth was composed of limestone slabs and tabular rocks ranging in size

from 18x15x5 cm to 15x10x3 cm. The rocks defining the feature's perimeter were on angle and sloped toward the center of the feature. The interior portion of the hearth consisted of two layers of tabular and angular rocks (in approximately equal percentages). The tabular pieces averaged 12x8x3 cm; the angular rocks typically were smaller (averaging 8x6x3 cm), but some were extremely blocky (ca. 8 cm thick). Many of the burned rocks were cracked in situ, but no evidence of disturbance was noted. Most of the rocks in the center of the hearth were horizontal; only a few were angled. The feature morphology resembles a "pie plate," with a flat bottom and sloping walls. Upon removal of the upper rock layer (ca. 124–130 cm), a lower layer of rocks was exposed (ca. 130–140 cm) and evidence of in situ burning was apparent. The bottoms of some of the limestone rocks exhibited charcoal staining, and charcoal flecking and patches of oxidized soil were contained within the feature matrix. Charcoal collected at 130–140 cm yielded a radiocarbon age of  $3710 \pm 50$  B.P. (Beta-102129, see Appendix A). A flotation sample collected at 130–140 cm contained no charred macrobotanical remains (see Appendix E). Only one flake was recovered from the feature matrix.

From 93–108 cm along the northern edge of Test Unit 3, Feature 7 (a hearth) had maximum excavated dimensions of 97 cm east-west by 40 cm north-south (Figure 51). Since the perimeter of the feature was clearly delimited in plan view and no burned rocks were exposed in the north trench wall opposite the test unit, the hearth is estimated to be ca. 1 m in diameter. It consists of a single layer of burned rocks ( $n = 46$ , 8.75 kg), with some exhibiting imbrication. Approximately 67 percent of the burned rocks were rounded or semirounded cobbles ranging in size from 5x5x5 cm to 10x10x5 cm. Most of the remaining rocks were slabs averaging 10x8x4 cm, but a few smaller angular fragments were present. Several of the larger rocks were cracked in situ. When the feature was completely exposed, a shallow basin shape was apparent. A charcoal stain, approximately 30 cm in diameter and 4 cm in maximum thickness, was present in the eastern portion of the hearth. Charcoal collected from this area at 102–106 cm yielded a radiocarbon age of  $4810 \pm 50$  B.P. (Beta-102127, see Appendix A). A flotation sample collected from 93–108 cm yielded no charred macrobotanical remains (see Appendix E). The feature fill

**Table 21. Summary of cultural materials from 41CV578, Analysis Unit 2, Test Units 1 and 3**

Provenience	Dart Points	Late-stage/ Finished Biface	Edge-modified Flakes	Unmodified Debitage	Unmodified Bones	Unmodified Shells	Totals
<b>TEST UNIT 1</b>							
Level 1 (0–10 cm)	–	–	–	–	–	–	–
Level 2 (10–20 cm)	–	–	–	2	–	–	2
Level 3 (20–30 cm)*	–	–	–	1	–	–	1
Level 4 (30–40 cm)*	–	–	–	1	–	–	1
Level 5 (40–50 cm)*	–	–	–	–	–	–	–
Level 6 (50–60 cm)	–	–	–	–	–	–	–
Level 7 (60–70 cm)	–	–	–	2	–	–	2
Level 8 (70–80 cm)	–	–	1	1	–	–	2
Level 9 (80–90 cm)	–	–	–	–	–	–	–
Level 10 (90–100 cm)	–	–	1	–	–	–	1
Level 11 (100–110 cm)	–	–	–	–	–	–	–
Level 12 (110–120 cm)	–	–	–	–	–	–	–
Level 13 (120–130 cm)	1	1	–	5	–	–	7
Level 14 (130–140 cm)	–	–	–	3	–	–	3
Level 15 (140–150 cm)	–	–	–	2	–	–	2
Feature 5 (124–142 cm)	–	–	–	1	–	–	1
Subtotals	1	1	2	18	0	0	22
<b>TEST UNIT 3</b>							
Level 1 (0–10 cm)	–	–	–	3	–	–	3
Level 2 (10–20 cm)	–	–	1	3	–	–	4
Level 3 (20–30 cm)	1	–	1	16	–	1	19
Level 4 (30–40 cm)	–	–	–	6	–	–	6
Level 5 (40–50 cm)	–	–	–	–	–	–	–
Level 6 (50–60 cm)	–	–	–	2	–	–	2
Level 7 (60–70 cm)	–	–	–	3	–	–	3
Level 8 (70–80 cm)	–	–	–	2	1	1	4
Level 9 (80–90 cm)	–	–	–	2	–	–	2
Level 10 (90–100 cm)	–	–	–	1	4	–	5
Level 11 (100–110 cm)	–	–	–	1	–	–	1
Feature 7 (93–108 cm)	–	–	–	–	–	1	1
Subtotals	1	0	2	39	5	3	50
Totals	2	1	4	57	5	3	72

\*Includes recent intrusive items.

produced one unmodified mussel shell.

### Discussion

The calibrated charcoal radiocarbon dates of 2145 (2120, 2080, 2050) 2015 B.C. for Feature 5 and 3650 (3635) 3615, 3580–3530 B.C. for Feature 7 (see Appendix A) demonstrate utilization of the area during the Middle Archaic period.

These dates are associated with two isolable hearths buried at approximately 90–150 cm. Sparse lithic artifacts were associated with both features. Although sediment flotation samples from both features failed to produce charred plant remains, this may be a result of inadequate sampling. Low frequencies of vertebrate and invertebrate remains indicate hunting and a reliance on an aquatic resource.



a



b

**Figure 50.** View southeast of (a) upper and (b) lower layers of burned rocks of Feature 5 in Test Unit 1, 41CV578.

The recovery of a Darl point at 20–30 cm suggests that the uppermost deposits, representing West Range fill, contain Late Archaic cultural debris. However, no discrete and/or isolable cultural deposits were encountered above 90 cm, and no clear stratigraphic boundary can be distinguished between the alluvial units.

### Analysis Unit 3

Consisting of late Holocene-age colluvium, Analysis Unit 3 encompasses all of the alluvial

deposits encountered in Backhoe Trench 4 and Test Unit 2 from surface to a maximum depth of 160 cm.

### *Sediments and Stratigraphy*

Backhoe Trench 4 revealed a 154-cm-thick profile of gravelly late Holocene colluvium at the interface between the  $T_2$  and  $T_1$  surfaces. The colluvial wedge is probably derived from the upper  $T_2$  terrace as it drapes onto the lower  $T_1$  surface. One soil (A-Bk-C profile) is imprinted on this unit. Cultural materials and features occur throughout the upper 100 cm of this deposit.

### *Cultural Materials*

In Test Unit 2, no cultural materials were recovered from 0–10 cm, but three flakes and modern items were found at 10–20 cm (Table 22). This matrix consists of a disturbed, mottled loam (apparently impacted by tracked vehicles) that extends to 23 cm, where an abrupt boundary with the underlying intact sediment was observed. Recent intrusive items were present from 20–23 cm, but most of the prehistoric cultural materials, including a Pedernales point, were found in Level 3 at 23–30 cm. From 30–80 cm, the cultural materials consisted of

83 burned rocks (14.5 kg), 154 flakes, 18 unmodified mussel shells, 1 perforated (i.e., drilled) mussel shell, and 6 lithic tools, including a Darl point at 60–70 cm. About 80 percent of these items are associated with Features 4 and 6 (see Cultural Features). A total of 9 burned rocks (1 kg) and 2 flakes were found in Levels 9 and 11; Levels 10 and 12 were culturally sterile.

### *Cultural Features*

Feature 4, a burned rock concentration that

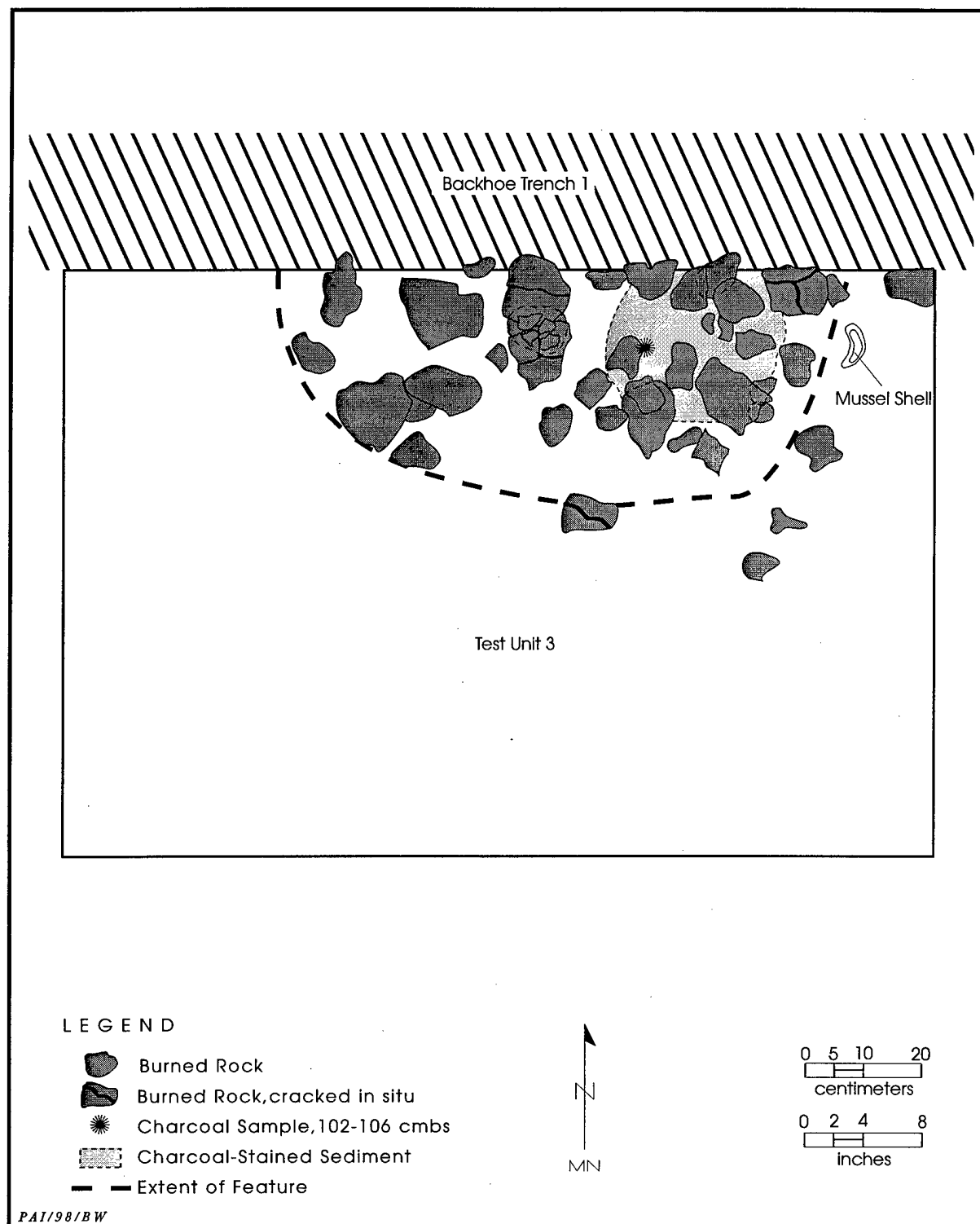


Figure 51. Plan of Feature 7 in Test Unit 3, 41CV578.

Table 22. Summary of cultural materials from 41CV578, Analysis Unit 3

Provenience	Dart Points	Bifaces	Uniface	Multifunctional Tool	Edge-modified Flakes	Unmodified Debitage	Modified Shell	Unmodified Shells	Totals
<b>BACKHOE TRENCH 4</b>									
Unknown depth	2	-	-	-	-	-	-	-	2
48 cm	1	-	-	-	-	-	-	-	1
Subtotals	3	0	0	0	0	0	0	0	3
<b>TEST UNIT 2</b>									
Level 1 (0-10 cm)	-	-	-	-	-	-	-	-	0
Level 2 (10-20 cm)*	-	-	-	-	-	3	-	-	3
Level 3 (20-30 cm)*	1	1	-	-	-	22	-	-	24
Level 4 (30-40 cm)	-	-	-	-	-	42	-	1	43
Level 5 (40-50 cm)	-	-	-	-	-	20	-	1	21
Level 6 (50-60 cm)	-	1	-	-	1	26	-	6	34
Level 7 (60-70 cm)	1	-	1	-	-	40	-	8	50
Level 8 (70-80 cm)	-	-	-	1	1	26	1	2	31
Level 9 (80-90 cm)	-	-	-	-	-	1	-	-	1
Level 10 (90-100 cm)	-	-	-	-	-	-	-	-	0
Level 11 (100-110 cm)	-	-	-	-	-	1	-	-	1
Level 12 (110-120 cm)	-	-	-	-	-	-	-	-	0
Feature 4 (23-34 cm)	-	-	-	-	-	12	-	-	12
Feature 6 (67-92 cm)	-	-	-	-	-	1	-	-	1
Subtotals	2	2	1	1	2	194	1	18	221
Totals	5	2	1	1	2	194	1	18	224

\*Includes recent intrusive items

extended across the entire unit, was encountered from 23-34 cm. It consisted of one to two layers of burned rocks ( $n = 124$ , 26.5 kg). Most were horizontally laid, with some slightly on angle (10-15°). The majority of rocks were fist sized and angular; however, some were tabular, averaging 15x13x4 cm. The feature matrix yielded 12 flakes. Although no evidence of disturbance was apparent, compression by tracked vehicles has probably compromised the feature's integrity to some extent. Burned rocks visible in the east wall and northeast corner of Test Unit 2 indicate that the feature extends an unknown distance in these directions. Feature 4 is probably associated with an extensive cultural deposit evidenced by artifacts exposed from the surface to approximately 50 cm throughout Backhoe Trench 4.

Feature 6 was encountered at 67-92 cm. This hearth consists of one to two layers of horizontally laid burned rocks ( $n = 69$ , 49 kg). In plan

view, the northern and western edges of the hearth were clearly delineated in the test unit, and the feature had maximum excavated dimensions of 94 cm east-west and 88 cm north-south. Large slabs (16x10x5 to 23x23x10 cm) and fist-sized and smaller angular rocks are common; several slabs were broken in situ into two to six pieces. No basin or pit was visible in cross section, but the feature generally slopes from southeast to northwest. Burned rocks exposed in the east wall of Test Unit 2 and the north wall of Backhoe Trench 4 reveal that Feature 6 extends at least 20 cm or more farther to the east. No burned rocks are visible in the south wall of the trench, opposite the test unit. Based on these exposures, the estimated dimensions of the entire hearth are 168 cm north-south and 114 cm east-west. The feature matrix produced one flake. No microdebitage, microfauna, or charred remains were observed in a processed flotation sample.

### Discussion

Although the features do not have corresponding chronometric data, the colluvial deposit is late Holocene in age, and in situ diagnostic artifacts (Pedernales and Darl points) provide evidence of cultural occupations during the Late Archaic period. The Pedernales point was recovered at the highest elevation; however, this may represent recycling of an older tool for reuse. A Baird point was recovered from the trench's backdirt, but its stratigraphic context is unknown. The uniqueness of this point is that it is manufactured from a nonlocal chert, which to date is a rare occurrence on sites at Fort Hood.

Moderate amounts of cultural materials were associated with both burned rock features (Features 4 and 6). Mussel shells surrounding the hearth may represent a food resource. One modified mussel shell was apparently drilled for ornamental purposes.

### Summary and Conclusions

Testing of Subarea A at 41CV578 revealed the presence of several cultural components buried in alluvial and colluvial sediments. Radiocarbon ages indicate that these occupations occurred during the Middle Archaic (3650–3530 and 2145–2015 B.C.) and Late Archaic (A.D. 560–635) periods. Diagnostic projectile points associated with the dated components correspond to these temporal assignments.

Macrobotanical and invertebrate remains associated with some of the hearths reveal exploitation of the riparian environment and aquatic resources for subsistence. The remains also suggest that these features were utilized primarily for cooking and possibly for nut processing.

This site can provide substantial and valuable data. It is characterized by multiple stratigraphically discrete features with associated assemblages, good preservation of perishable remains and ornamental artifacts, and presence of a non-local chert material. Therefore, site 41CV578 is recommended as eligible for listing in the NRHP.

### 41CV1211

#### Site Setting

Site 41CV1211 is situated on the south side of House Creek and subsumes the T<sub>0</sub> and T<sub>1</sub>

surfaces. The creek defines the northern site boundary. With the exception of a narrow but dense strip of large hardwood trees along House Creek and a small tributary at the northeastern margin, the site is open and covered by grasses. In addition to agricultural activities—evidenced by a large barbwire-fenced corral—the surface of the site has been minimally disturbed by vehicular traffic and erosion. Site elevation is 250 m above mean sea level.

### Previous Work

The site was originally recorded in May 1986 by Mesrobian, Davis, Kooren, Hoffman, and Rodriguez (Texas A&M University) as a low-density burned rock and lithic scatter; site dimensions were defined as 150x140 m. Although few artifacts were observed, the investigators noted that much of the site might be buried in the 1+-m-deep terrace sediments. The surface of the site was estimated to be 70 percent disturbed by tracked vehicles, cattle, and erosion.

Trierweiler and Frederick (Mariah Associates) revisited and reevaluated the site on 16 June 1992. Site dimensions were altered to 165x130 m, with a northwest-southeast long axis. No cultural materials were observed on the densely vegetated surface of the site; the lack of exposures prevented identification of alluvial fills. Examination of the cutbanks also yielded no evidence of cultural remains, but reconnaissance of a cutbank exposure (75 m east of the site) revealed evidence of cultural materials deeply buried at ca. 5 m. The site boundary was not revised to include this area, nor was this area recorded as a new site. Due to the potential for intact, buried archeological components, shovel testing was recommended.

On 10 July 1992, a shovel testing crew returned and excavated 20 shovel tests to 40 cm. Only 2 (10 percent) were positive. Total recovery from these positive shovel tests included three flakes at 0–20 cm. Although few artifacts were found in the upper deposits of the site, the investigators concluded that 41CV1211 had the potential for intact cultural materials of unknown significance below the depth of the shovel tests. A minimum testing effort of 4 m<sup>2</sup> of manually excavated test pits and 3–4 mechanically excavated trenches was recommended to determine the National Register eligibility of the site (Trierweiler, ed. 1994:A1349).

### **Work Performed**

In June 1996, Prewitt and Associates completed formal testing of 41CV1211. Five backhoe trenches (Backhoe Trenches 1–5) and four 1x1-m test units (Test Units 1–4) were excavated (Figure 52). Approximately 9 m<sup>3</sup> was manually dug. The cutbank that was previously noted to contain deeply buried cultural materials was resurveyed, but the reported cultural materials were not re-located and no other cultural materials were observed in the vicinity.

Backhoe Trenches 1 (17.0x0.8x1.8 m), 4 (14.0x0.8x1.2 m), and 5 (10.0x0.8x1.1 m) were placed on the floodplain (T<sub>0</sub>), excavated to basal gravels, and oriented to 67°, 22°, and 30° magnetic north, respectively. Backhoe Trenches 2 (14.0x1.5x3.3 m) and 3 (14.0x1.5x3.6 m) were placed at the front edge of the T<sub>1</sub> surface and oriented to 30° and 10° magnetic north, respectively. No cultural materials were observed in a gravel lens at 50 cm in the east wall profile of Backhoe Trench 2, a few small burned rocks were found at 30–50 cm in the east wall profile of Backhoe Trench 4, and a few small burned rocks and a core were discovered on the backdirt excavated from Backhoe Trench 5. Backhoe Trench 5 was profiled and soil geomorphology was assessed.

Test Unit 1, placed on the floodplain near House Creek and a few meters northwest of Backhoe Trench 1, was excavated to dense gravels at 160 cm. Test Units 2 and 4, excavated to 120 and 90 cm, respectively, were placed near Backhoe Trenches 4 and 5 at the interface of the terraces. Test Unit 3 was placed along the east wall of Backhoe Trench 2, above the burned rocks observed at 50 cm in the profile, and excavated to 290 cm. The size of this unit was decreased from 100x100 cm to 50x50 cm from 140–290 cm because of low recovery. Test Units 1, 2, and 4 were oriented relative to magnetic north, but Test Unit 3 was oriented parallel to the long axis of Backhoe Trench 2.

### **Site Extent and Depth**

Site 41CV1211 covers an area 150 m northwest-southeast by 50 m northeast-southwest and encompasses two geomorphic surfaces—the active floodplain (T<sub>0</sub>) of House Creek and its upper T<sub>1</sub> terrace. Although no cultural materials were found in Test Unit 1 at

the front of the T<sub>0</sub> surface, some artifacts were recovered in the upper 80 cm of deposits along the interface between the T<sub>0</sub> and T<sub>1</sub> in Test Units 2 and 4. Very few artifacts were found from 0–80 cm (in Test Unit 3) in the sediments underlying the T<sub>1</sub> surface.

### **Sediments and Stratigraphy**

Site 41CV1211 appears to consist of three Holocene-age alluvial fills underlying the T<sub>1</sub> and T<sub>0</sub> surfaces (Figure 53). The T<sub>0</sub> terrace represents a Ford alluvial fill that is laterally inset to the lower West Range deposits of the T<sub>1</sub> terrace. The Ford deposits of Backhoe Trench 1 consist of 126 cm of intercalated thin beds of very dark grayish brown (10YR 3/2) sandy clay loam and brown (10YR 4/3) muddy fine to coarse sand overlying moderately sorted, rounded clast-supported gravels (126–172+ cm).

Backhoe Trench 5 revealed a drape of very dark gray loamy Ford alluvium (0–53 cm) overlying a yellowish brown gravelly clay loam lower West Range alluvium (53–88+ cm). This profile is imprinted with an A-Bw soil. Similar profiles were observed in Backhoe Trench 4 and in Test Units 2 and 4, all located along the interface between the two terraces. Backhoe Trench 3 revealed lower West Range deposits (0–128 cm) overlying what appears to be Fort Hood alluvium (128–301+ cm). The lower West Range sediments are imprinted with an A-Bwk-C soil profile. The Fort Hood alluvial deposits are imprinted with two truncated soils (2Bwkb-2C-3Bb profile).

### **Definition and Interpretation of Analysis Units**

The analysis units are defined for the site based on differing alluvial fills. Analysis Unit 1 consists of the sandy T<sub>0</sub> Ford deposits along House Creek. Analysis Unit 2 comprises the gravelly lower West Range deposits underlying the T<sub>1</sub> surface.

#### **Analysis Unit 1**

##### **Cultural Materials**

Although no prehistoric cultural artifacts were found in Test Unit 1, modern metal fragments were found to a depth of 40 cm, charcoal flecking was present from 40–140 cm, and two

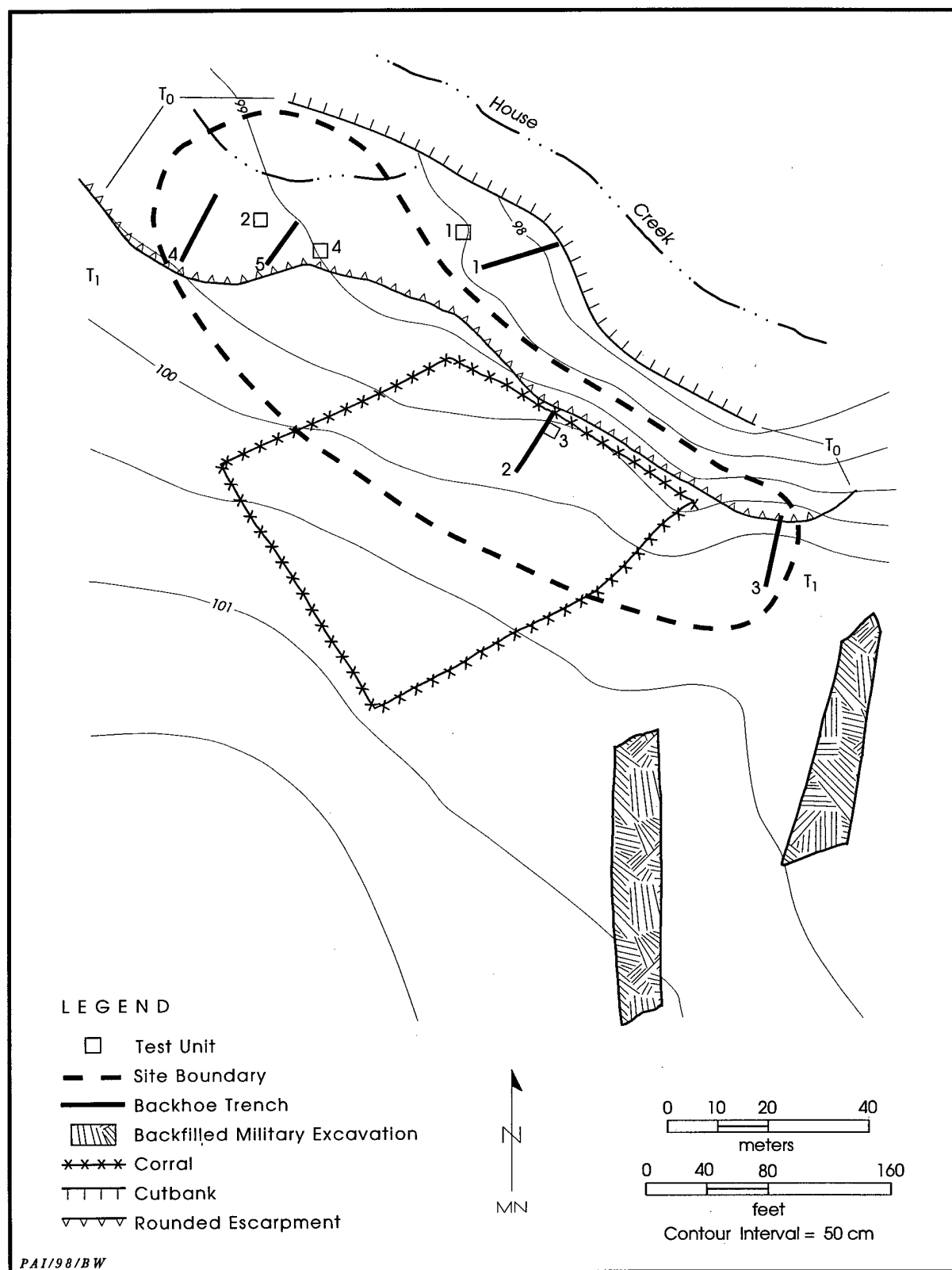


Figure 52. Site map, 41CV1211.



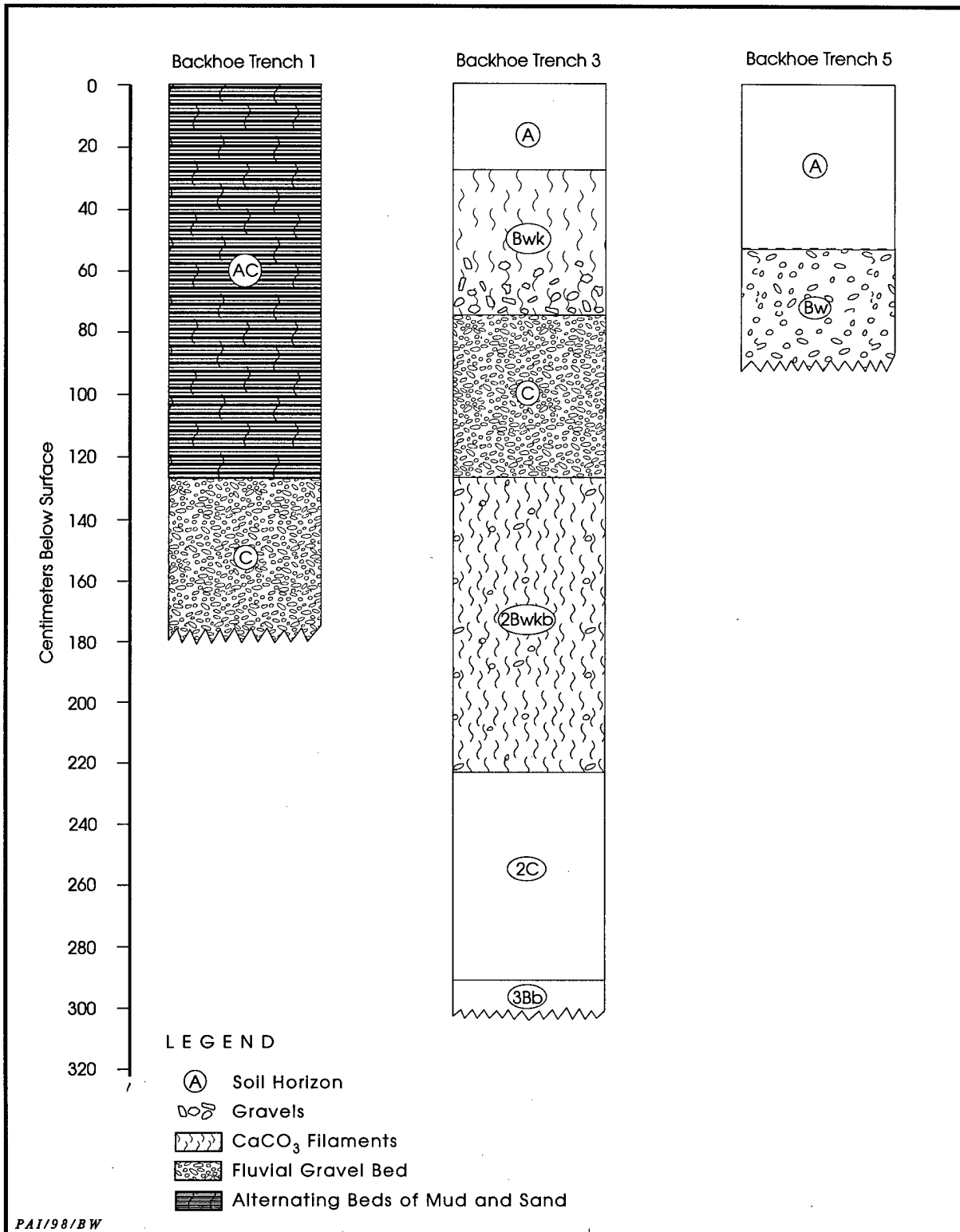


Figure 53. Profiles of Backhoe Trenches 1, 3, and 5, 41CV1211.

decayed bone fragments were found among dense gravels at 140–150 cm (Table 23). Within the test units (Test Units 2 and 4) excavated at the interface of the terraces, cultural materials were found at 20–60 cm in Test Unit 2 and at 30–80 cm in Test Unit 4. Recovery included 34 flakes, a reworked Scallorn point, an edge-modified flake, and 40 (4.5 kg) small burned rocks from Test Unit 2 and 67 flakes, an untypeable dart point, 13 (3 kg) burned rocks, and 3 small bone fragments from Test Unit 4. A peak in recovery occurred at 30–50 cm in Test Unit 2 and at 50–70 cm in Test Unit 4. Charcoal flecking was observed only at 30–50 cm in Test Unit 2 and at 60–70 cm in Test Unit 4. A flotation sample that yielded only an extremely small quantity of charcoal was collected at 40–50 cm in Test Unit 2; a small charcoal sample was collected from the matrix in Test Unit 4 at 60–70 cm.

### Discussion

The profiles of Backhoe Trench 1 and Test Unit 1 consisted of unconsolidated muds and

sands overlying channel gravels. The evidence of recent debris in the upper 40 cm and charcoal in the majority of the levels excavated in Test Unit 1 suggest that the fill aggraded rapidly from overbank flooding, but no cultural artifacts were found. The profiles of Backhoe Trenches 4 and 5 and Test Units 2 and 4 consist of drapes of Ford alluvium overlying lower West Range alluvium. Although some cultural features were discovered, no cultural deposits were demonstrated to be intact. The diagnostic artifacts, a Scallorn arrow point and an untypeable dart point, suggest that the cultural deposits contained within this analysis unit are representative of transitional Late Archaic into Late Prehistoric occupations.

### Analysis Unit 2

#### Cultural Materials

Total recovery from Test Unit 3 consisted of two flakes and two burned rocks found from 0–80 cm.

### Discussion

The profiles of Backhoe Trenches 2 and 3 consist of clayey and gravelly lower West Range alluvium. Test Unit 3 was virtually devoid of any cultural artifacts.

### Summary and Conclusions

Site 41CV1211 is comprised of Ford, lower West Range, and possibly Fort Hood alluvial sediments within which varying amounts of cultural materials were recovered from the Ford and lower West Range units. The context of the materials found in deposits immediately adjacent to House Creek is questionable because they are within a relatively recent alluvial deposit that contains no evidence of cultural occupation. Sparse cultural deposits of

**Table 23. Summary of cultural materials from 41CV1211, Analysis Unit 1**

Provenience	Arrow Point	Dart Point	Edge-modified Flake	Unmodified Debitage	Unmodified Bones	Totals
<b>TEST UNIT 1</b>						
Level 15 (140–150 cm)	0	0	0	0	2	2
<b>TEST UNIT 2</b>						
Level 1 (0–10 cm)	–	–	–	–	–	0
Level 2 (10–20 cm)	–	–	–	–	–	0
Level 3 (20–30 cm)	–	–	1	1	–	2
Level 4 (30–40 cm)	–	–	–	13	–	13
Level 5 (40–50 cm)	1	–	–	17	–	18
Level 6 (50–60 cm)	–	–	–	3	–	3
Subtotals	1	0	1	34	0	36
<b>TEST UNIT 4</b>						
Level 4 (30–40 cm)	–	–	–	6	–	6
Level 5 (40–50 cm)	–	–	–	3	–	3
Level 6 (50–60 cm)	–	–	–	21	1	22
Level 7 (60–70 cm)	–	1	–	33	1	35
Level 8 (70–80 cm)	–	–	–	4	1	5
Subtotals	0	1	0	67	3	71
<b>Totals</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>101</b>	<b>5</b>	<b>109</b>

late Holocene age, buried from 0–80 cm in Ford and lower West Range alluvial sediments, were discovered farther back on the terraces along House Creek. Some of the cultural deposits probably represent the Late Prehistoric period (evidenced by the Scallorn point), with the remainder probably representative of Late Archaic occupations. Although buried cultural materials encountered in alluvial sediments would at first seem to indicate that this site has a promising research potential, several factors suggest that this is not the case. No single occupation layer could be identified, and cultural materials were dispersed throughout nearly a meter of sediments. No intact cultural features were encountered despite the relative intensity of subsurface prospection. The small amount of charcoal found in the flotation sample suggests that charred macrobotanical remains are very rare. Furthermore, the frequency of cultural materials is extremely low throughout the deposits, and it is likely that the prehistoric occupations were very ephemeral. Thus, it appears that the research potential of this site is limited.

#### **41CV1218**

##### **Site Setting**

Site 41CV1218 is situated downstream of the confluence of House and Ripstein Creeks on the north bank of House Creek. Although most of the area is clear and covered with grasses, a few isolated stands of juniper and oak are present. Impacts include a rock wall remnant, erosion, and bulldozing activity evidenced by push piles; in addition, several tank trails crisscross the site surface. Site elevation is 265 m above mean sea level.

##### **Previous Work**

On 9 May 1986, McCabe and Dureka (Texas A&M University) recorded the site as a burned rock and debitage scatter covering an area 275 m east-west by 125 m north-south. Most of the cultural materials were observed in disturbed areas. One drill fragment was collected. An estimated 85 percent of the site was disturbed by vehicular traffic and erosion.

On 6 April 1992, Truesdale and Doering (Mariah Associates) revisited 41CV1218. The site

was located on a colluvial terrace remnant (T<sub>2</sub>) consisting of a strath surface mantled by 1.2–2.0 m of predominantly fine-grained alluvium. The soils were strongly developed and exhibited an A-Bt-Bkm-C profile. Soil textures were clay possibly grading to Vertisols. The degree of soil development and color (strong red) implied that these soils were Pleistocene sediments and correlated to the Jackson alluvium (Nordt 1992). The site surface was extensively disturbed by tracked and wheeled vehicles. Generally, ruts were 40–50 cm deep, but some extended to more than 100 cm where subsequent gullying had occurred. Other disturbances included bulldozed push piles and a historic rock wall. Due to the degree and depth of the impacts, shovel testing was not warranted. However, it was determined that backhoe trenching could aid in documenting the presence of sediments with intact cultural materials below the level of disturbance. Since the site had the potential for deeply buried cultural deposits, the recommended minimum testing effort included two backhoe trenches (Trierweiler, ed. 1994:A1352–A1353).

##### **Work Performed**

On 26 June 1996, Prewitt and Associates completed formal testing of 41CV1218. The test excavations included two backhoe trenches and a 1x1-m test unit (Figure 54). A total of 1 m<sup>3</sup> was manually excavated. Backhoe Trench 1 was placed 10–12 m east of the stone wall and perpendicular to House Creek. Oriented to magnetic north, the trench measured 30.0x0.8x2.0 m. A few burned rocks were observed on the backdirt pile. Also perpendicular to House Creek, Backhoe Trench 2 was placed near the site center and east of Backhoe Trench 1. The trench was oriented to 349° and had dimensions of 18.0x0.8x1.4 m. No cultural materials were observed. Excavated to 100 cm, Test Unit 1 was placed at the southern end of Backhoe Trench 1 adjacent to the east wall.

##### **Site Extent and Depth**

Based on the extent of surficial cultural materials and the testing results, the horizontal extent of the site remains unchanged from the 275x125-m area first recorded in 1986. Due to the presence of extremely sparse subsurface cultural materials, no vertically discrete

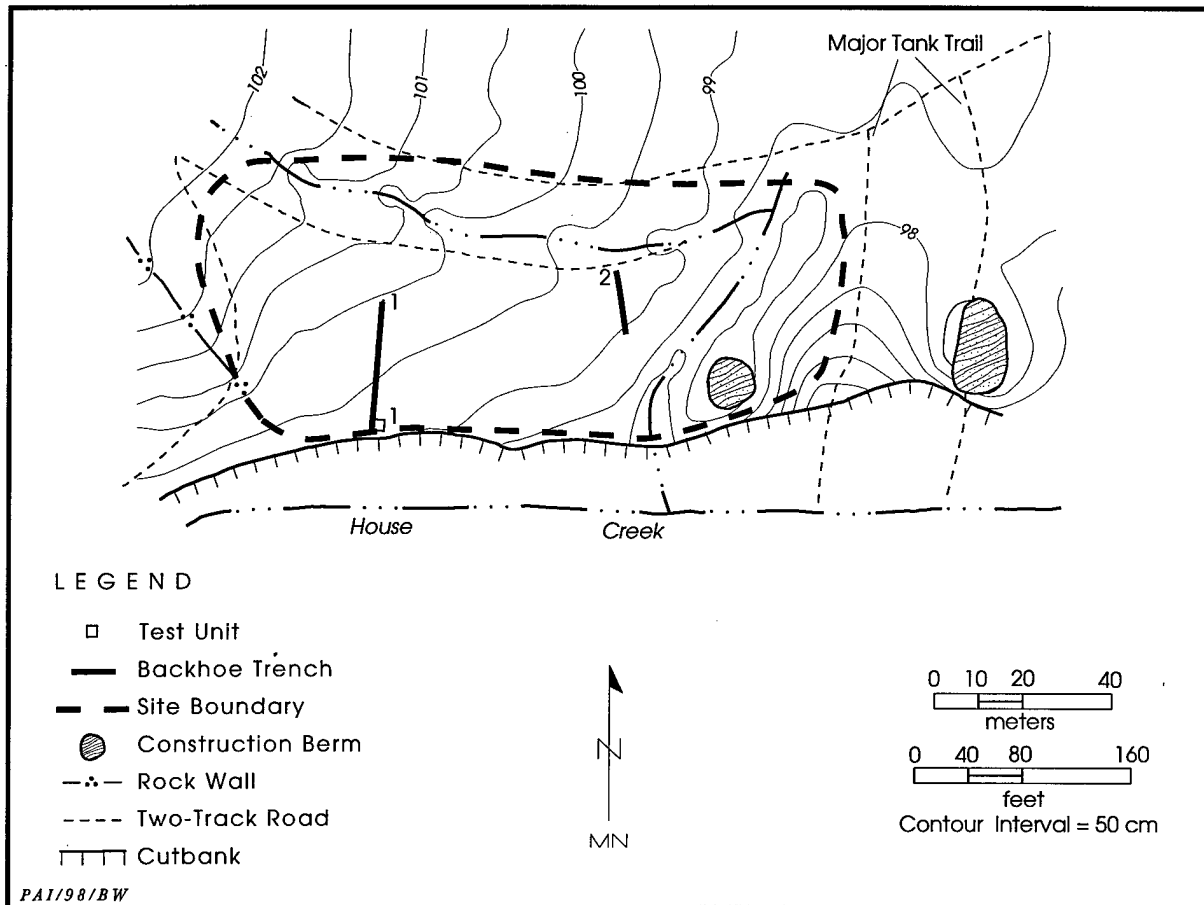


Figure 54. Site map, 41CV1218.

occupations were encountered in the test excavations.

#### Sediments and Stratigraphy

The 203-cm-thick profile of Backhoe Trench 1 consisted of gravelly and fine-grained alluvium believed to represent late Pleistocene Jackson alluvium mantled by late Holocene West Range alluvium. Two soils are imprinted on these alluvial deposits. The upper soil (A-Bw profile) consists of a 54-cm-thick dark grayish brown clay loam A horizon and a 20-cm-thick brown clay loam Bw horizon imprinted on West Range alluvium. Underlying the soil is a 13-cm-thick strong brown very gravelly clay loam. This well-sorted fluvial gravel bed overlies a truncated soil (2Bwb-2Cg profile) formed on Jackson alluvium. The 76-cm-thick 2Bwb horizon is very pale brown silty clay loam. The 40+-cm-thick 2Cg

horizon is a light brownish gray sandy clay.

#### Cultural Materials

Three of 10 levels excavated in Test Unit 1 produced a total of four small burned rocks (0.75 kg). One Victoria and a Zephyr point were collected from the site surface.

#### Discussion

Site 41CV1218 has burned rocks and lithic artifacts scattered across a surface that has been severely impacted by vehicular traffic. The paucity of cultural materials recovered in the test excavations and lack of stratigraphically isolable components indicate that buried, intact archeological deposits are not present. Based on testing results, this site is recommended as not eligible for listing in the NRHP.

## 41CV1219

### Site Setting

Site 41CV1219 is an extensive open camp located within a large meander of House Creek. The site is bounded on the east, south, and south-west by House Creek and to the north by an unnamed tributary; the confluence of these streams is located at the northeast corner of the site (Figure 55). A large portion of the area has been cleared and is covered with grasses. Stands of oaks and junipers are present along the northern site boundary, with mixtures of deciduous hardwood trees lining the banks of House Creek. Disturbances include clearing, burning, military activity, vehicular traffic, remnants of a rock wall, probable cultivation, and erosion. The site is 250–260 m above mean sea level.

### Previous Work

Strychalski and Dureka (Texas A&M University) recorded the site on 9 May 1986. Burned rocks and lithic artifacts were scattered across an area measuring 600 m north-south by 260 m east-west. Much of the burned rocks were noted over a large area of the floodplain, suggesting that the terrace was plowed historically. The densest concentration of artifacts was observed on a low knoll in the southwest corner of the site. One untyped dart point was collected. An estimated 50 percent of the site was disturbed by erosion, military and agricultural activities, animals, and dirt roads. For management purposes, the site was later classified as a lithic resource procurement area (LRPA) because of its large size.

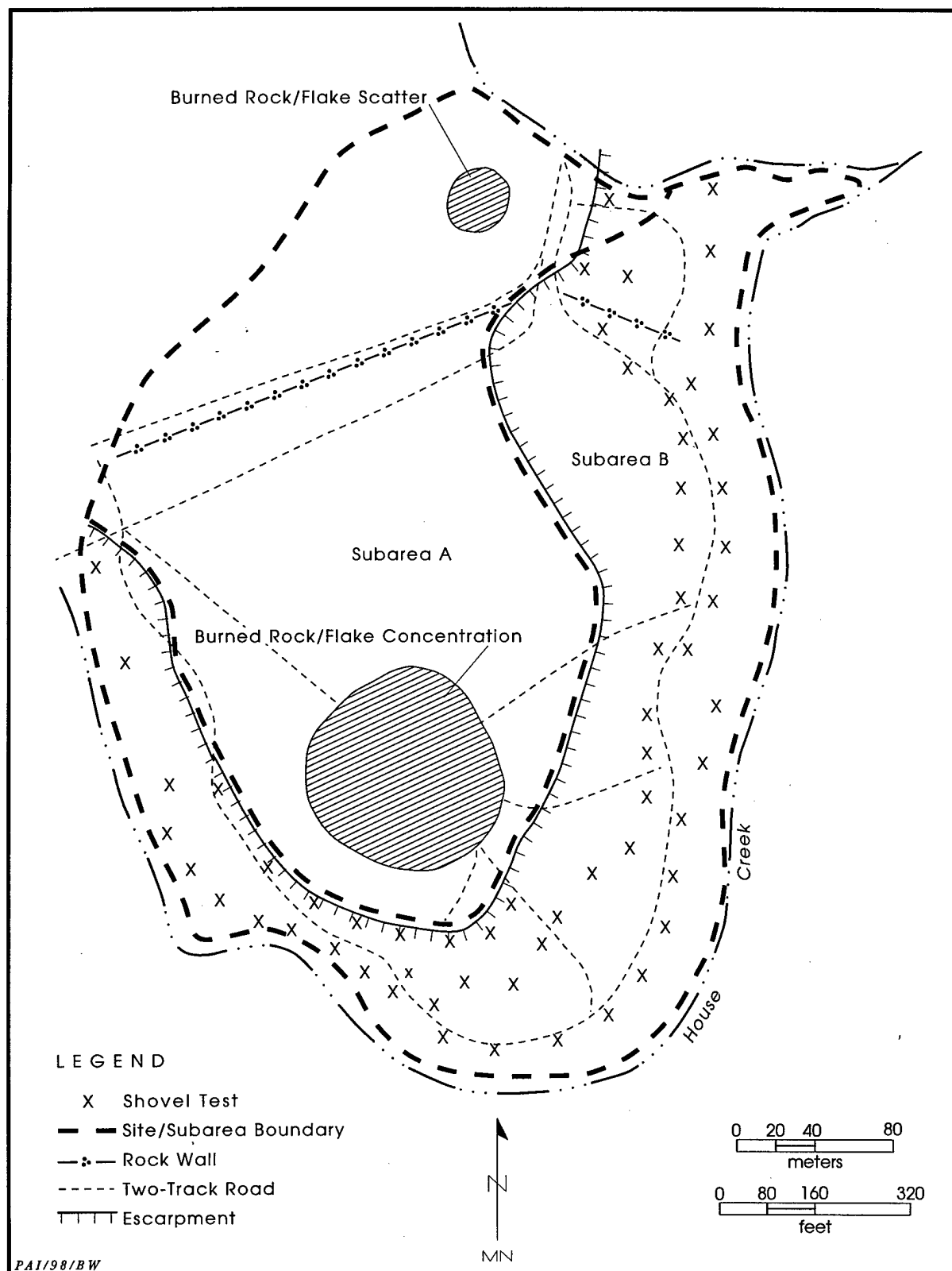
Turpin and Abbott (Mariah Associates) revisited the site on 18 November 1992. The site was divided into Subareas A and B based on the potential for cultural materials in primary context. Subarea A included a large late Pleistocene terrace ( $T_2$ ) and a smaller segment of bedrock slope at the valley margin. The terrace was underlain by a strongly rubified, gravelly loam that exhibited an Ap-Bt-Bk-Cox profile. Although much of this surface was noted to be heavily disrupted by very recent military activity and the margins had been beveled by sheetwash, the terrace appeared to have been cleared historically for agricultural use. This conclusion was supported by the presence of low, crude rock walls

on the margins of the cleared area and by the broad scatter of artifacts observed on the surface. At the south-central margin of the subarea, burned rocks and flakes were concentrated in an area measuring 100 m in diameter. One Bulverde point was collected from the surface of this area.

Subarea B included the Holocene alluvial deposits of the lower terraces ( $T_1$  and  $T_0$ ) along House Creek. Soils developed in the late Holocene deposits were observed to range from an Ap-Bwk-C profile on the  $T_1$  surface to an A-C profile on the  $T_0$  surface. Although most of the exposures provided by House Creek and its unnamed tributary within the site area revealed grayish brown sandy loams representing late Holocene alluvium (West Range and Ford units), an off-site exposure located just upstream suggested that much of the  $T_1$  terrace is underlain by brown loams of the early to middle Holocene Fort Hood fill at a depth that possibly represents the earlier Georgetown unit (Nordt 1992). The surface of this subarea also appeared to have been historically plowed in all but a few places and had been recently disturbed by tracked vehicles. However, unlike the Pleistocene terrace, few artifacts were visible on the disturbance-created exposures, although several burned rocks were observed at 1–1.5 m in the bank of an eroded roadcut perpendicular to House Creek, and a scatter of burned rocks was noted at the northwest margin of the site.

A testing crew returned to 41CV1219 on 16 December 1992. This investigation included 60 shovel tests excavated to a maximum depth of 50 cm in Subarea B. No shovel tests were excavated in Subarea A due to its lack of potential for intact cultural deposits. Only 6 (10 percent) of the 60 shovel tests produced positive results; 32 burned rocks, 7 flakes, 1 ecofact, and 1 historic item were recovered.

On 1 April 1993, Kleinbach and Abbott (Mariah Associates) revisited the site to evaluate its potential for addressing questions of lithic resource procurement and reduction. Although a few natural chert cobbles were observed on the late Pleistocene terrace surface and in the modern channel and cutbanks of House Creek, they were quite scarce. For this reason, the site was judged to lack sufficient naturally occurring cherts to serve as a basis for providing lithic procurement information. Consequently, impact zones were not defined and the site was excluded



**Figure 55.** Site map, 41CV1219 (modified from Trierweiler, ed. 1994:A1355).

from the LRPA resurvey.

The results of the assessment and preliminary shovel testing indicated that the upper portion (ca. 30–50 cm) of the sediments in Subarea B had been disturbed by clearing and plowing activities. However, the potential for intact cultural deposits of unknown significance below the depth of shovel testing remained. Therefore, formal testing was recommended to evaluate the National Register significance of Subarea B. The recommended testing effort included 6–10 m<sup>2</sup> of manually excavated test units and seven backhoe trenches (Trierweiler, ed. 1994:A1354–A1357).

### **Work Performed**

Burned rocks noted by previous investigators scattered in a roadcut at the northwest margin of Subarea B were re-located. Previously recorded burned rocks buried at 1–1.5 m in another roadcut perpendicular to House Creek were also re-located, in addition to displaced burned rocks and sparse lithic artifacts in the road adjacent to the buried burned rocks.

On 2 August 1996, Prewitt and Associates completed formal testing of Subarea B at 41CV1219 (Figure 56). The test excavations included nine backhoe trenches (Backhoe Trenches 1–9) and four 1x1-m test units (Test Units 1–4). A total of 4.9 m<sup>3</sup> was manually excavated.

All of the test excavations were placed on the T<sub>1</sub> surface. Backhoe Trench 1 was placed just below the edge of the Pleistocene scarp (T<sub>2</sub>) at the western margin of Subarea B. Oriented to magnetic north, the trench had dimensions of 12.0x1.5x3.0 m. No cultural materials were observed. At the south-central margin of the subarea, Backhoe Trench 2 (12.0x1.5x2.9 m) was excavated approximately 30 m north of and perpendicular to House Creek; the trench was oriented to 338°. A few burned rocks were exposed in the west wall at 40–50 cm. Backhoe Trench 3 (15.0x1.5x2.9 m, oriented to 307°) was located 30 m west of House creek and just north-northwest of the roadcut where burned rocks were buried at 1–1.5 cm. No cultural materials were encountered. Backhoe Trenches 4 and 5 were situated near the northeast margin of the subarea. These two trenches ranged in length from 12–14.5 m, in width from 0.80–1.5 m, and in depth from 2.5–2.9 m. No cultural materials were exposed in either trench. Placed near the

northeastern site margin, Backhoe Trench 6 was excavated 50–60 m west of the confluence of House Creek and its tributary. Oriented to 54°, the trench measured 18.0x1.5x3.3 m. No cultural materials were observed. Backhoe Trench 7 was situated approximately 50 m west of House Creek and 25 m southwest of Backhoe Trench 3. The trench measured 14.5x1.5x3.2 m, was oriented to 66°, and exposed no cultural materials. Backhoe Trenches 8 and 9 were placed east of Backhoe Trench 2 at the south-central margin of the subarea. Backhoe Trench 8 was excavated approximately 50 m north of the terrace edge, with Backhoe Trench 9 about 20 m further upslope (north). Both were perpendicular to the creek and had average dimensions of 13.5x1.5x3.0 m. No cultural materials were encountered in either trench.

Test Unit 1, excavated to Pleistocene-age sediments at 60 cm, was situated adjacent to the sparse scatter of burned rocks on the northwest portion of the site. Excavated to 100 cm, Test Unit 2 was placed along the west wall of Backhoe Trench 2 above the burned rocks exposed at 40–50 cm in the profile. Test Unit 3, excavated to 170 cm, was placed immediately south of the eroded roadcut in which burned rocks were observed at a depth of ca. 150 cm. Test Unit 4 was situated directly over the north edge of the roadcut in which burned rocks were exposed at approximately 150 cm. The upper 100 cm of deposit was removed as overburden since no cultural materials were observed in or recovered from the cutbank of House Creek, the two trenches (Backhoe Trenches 3 and 7) excavated near the roadcut, or the upper 100 cm of the roadcut and Test Unit 3. One biface fragment was recovered from the overburden. Test Unit 4 was excavated from 100–160 cm. Due to the slope of the roadcut, the unit's north-south dimension increased in size with depth to a maximum of 130 cm.

### **Site Extent and Depth**

The terrace is wedged between the higher, late Pleistocene terrace and House Creek and its tributary. Based on surficial cultural materials and the testing results, the horseshoe-shaped terrace covers approximately 67,500 m<sup>2</sup>.

Three of four test units produced sparse cultural materials. Although Feature 1 was encountered at 143–155 cm in Test Unit 4, this

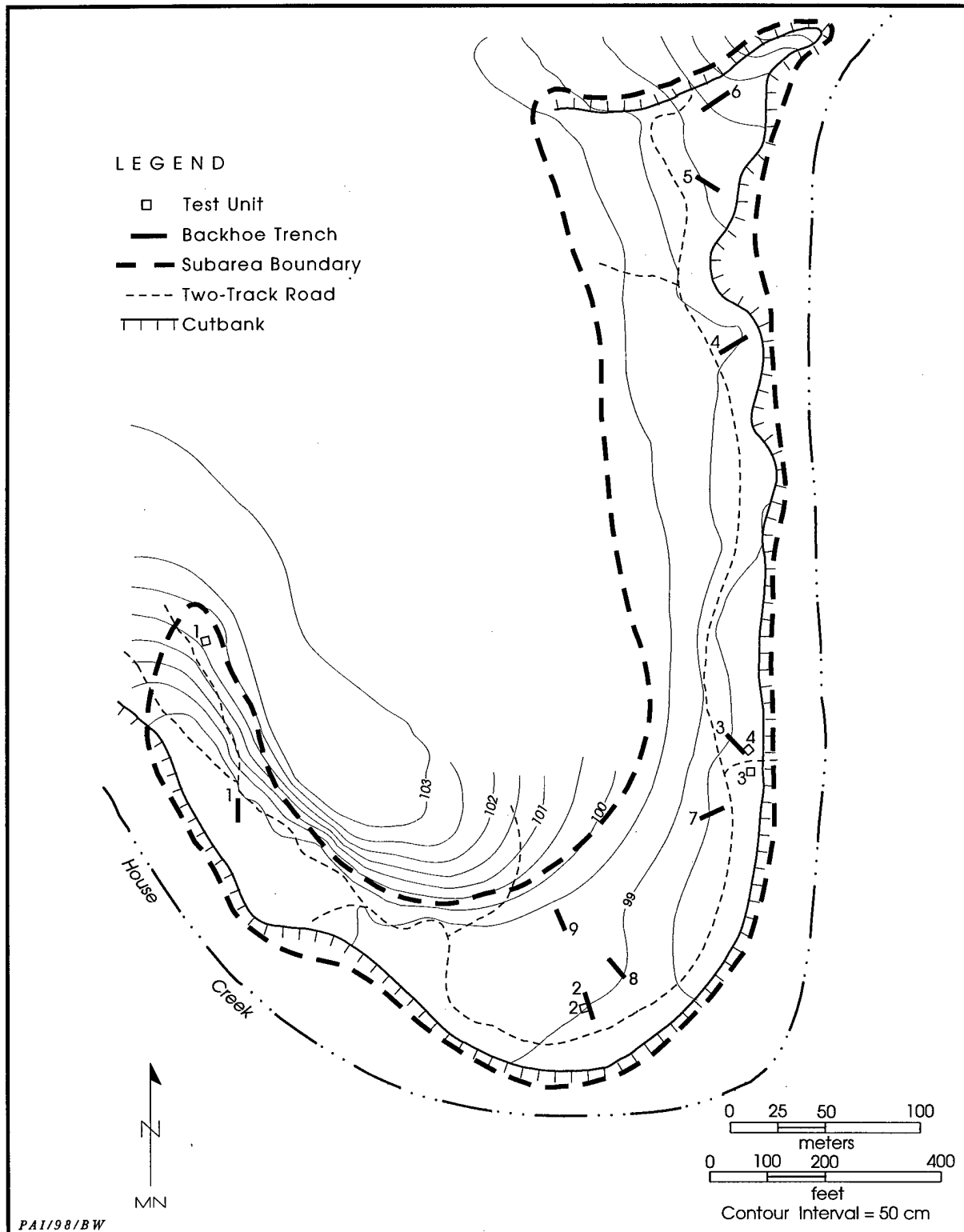


Figure 56. Map of Subarea B, 41CV1219.



ephemeral deposit appears to represent part of a larger cultural zone which has been subsequently eroded and dispersed by the roadcut.

### **Sediments and Stratigraphy**

The backhoe trench profiles revealed the presence of Ford and lower West Range alluvial deposits below the T<sub>1</sub> surface. Depending on the distance of the trench from House Creek, the various profiles exhibit thin mantles to thick deposits of Ford sediments overlying gravelly to muddy lower West Range deposits or Ford alluvium laterally inset to lower West Range deposits.

The 268-cm-thick profile of Backhoe Trench 1 consists of dark loamy Ford alluvium imprinted with four weakly developed soils (AC-2Ab-2Bkb-3Abk-4Abk-4Bwb-4C profile). Backhoe Trench 2 revealed 246 cm of dark grayish brown to brown loamy and sandy clay loam Ford alluvium overlying a fluvial gravel bed (246–287+ cm) of lower West Range age. The Ford deposits are imprinted with one soil (A-Bw-Ck-C profile). Backhoe Trench 3 consists of dark loamy to sandy Ford alluvium (0–196 cm) overlying gravelly and sandy lower West Range deposits (196–279+ cm). The overlying Ford deposits are imprinted with one soil (A-Bw-Bk profile). One truncated, very pale brown soil (2Bwkb horizon) is present within the lower West Range alluvium at 229–279+ cm. The profile of Backhoe Trench 5 consists of a 25-cm-thick very dark brown silty clay loam A horizon formed on Ford/lower West Range alluvium. Underlying this mantle is a brown to dark brown clayey Bw-Bwk horizon (25–251+ cm) formed on lower West Range alluvium. Backhoe Trench 9 revealed a thin drape of Ford alluvium (0–55 cm) overlying gravelly and muddy lower West Range alluvium (55–257+ cm). A weakly developed soil (A-Bw profile) was observed in the Ford sediments, while a moderately developed soil (2Ab-2Bwkb profile) formed on the lower West Range muddy facies below a clast-supported fluvial gravel bed (55–155 cm) of lower West Range age.

### **Cultural Materials**

Approximately half of all levels excavated yielded cultural materials. These include 26 flakes, 1 biface, and 7 burned rocks from Test Unit 1 and 6 burned rocks and 2 bone fragments

from Test Unit 2. In Test Unit 3, Levels 11–17 (100–170 cm) produced a total of 6 flakes and 17 burned rocks (2 kg). Nineteen (82.6 percent) of the 23 cultural items were found in Levels 15–17 (140–170 cm). Test Unit 4 contained 2 flakes, an untyped dart point, and a burned rock. In addition, a Gower point was collected from the surface.

### **Cultural Features**

Encountered at 143–155 cm in Test Unit 4, Feature 1 consisted of a single layer of eight horizontally laid tabular burned rocks (4 kg). The feature was confined to the southern edge of the unit and had maximum dimensions of 38 cm north-south by 36 cm east-west. The average size of the rocks in this small concentration was 10x7x3 cm. Sparse flecks of charcoal were observed among the rocks and the surrounding matrix. No other cultural materials were found in association. This burned rock feature may be the remnants of a hearth; however, the majority of Feature 1 was probably impacted by the roadcut.

### **Discussion**

The test excavations produced sparse amounts of cultural materials buried primarily in the Ford alluvium. The only spatially discrete cultural remains were encountered in Test Units 3 and 4 at 140–160 cm. Although this deposit contained some burned rocks, a few flakes, and Feature 1, the materials were ephemeral and diffuse. In addition, the terrace in the area of Test Units 3 and 4 has been bisected by a roadcut. This impact, along with subsequent erosion, has exposed cultural materials that probably were associated with the remains found in the test excavations. This disturbance has severely compromised the integrity of deposits; thus, based on the testing results, this site is recommended as not eligible for listing in the NRHP.

**41CV1221**

### **Site Setting**

The site is an open camp bounded on the south by House Creek and bisected on the east by an unnamed tributary, the confluence of which is at the southeastern margin of the site. Another

deeply incised tributary flows into House Creek at the southwestern site boundary where the vertical cutbank is 7 m high. An east-west-oriented road parallels House Creek and bisects the site area (Figure 57). The higher Pleistocene terrace is primarily open and covered with grasses. Isolated stands of juniper and live oak are present. The lower Holocene terrace consists of a riparian woodland with a moderate understory of greenbrier and grapevine. Site elevation is 240–250 m above mean sea level.

### Previous Work

Mesrobian, Kooren, Dureka, and Rodriguez (Texas A&M University) recorded the site on 9 May 1986. An extensive burned rock and lithic scatter was noted, in addition to a vandalized burned rock midden. Maximum site dimensions

were 690 m east-west by 150 m north-south. Two dart points and one grooved piece of limestone were collected. An estimated 55 percent of the site was disturbed by erosion, vehicular traffic, vandalism, and cattle.

Trierweiler and Frederick (Mariah Associates) revisited the site on 10 June 1992. The previously defined site size was relatively unchanged, but the site was divided into Subareas A and B based on differing geomorphic contexts. Subarea A included the younger, Holocene-age deposits observed in two distinct areas of the site. The first area consisted of a narrow wedge of Ford alluvium along House Creek and the second included the upper and lower West Range and Ford units (Nordt 1992) confined within the small valley of the unnamed tributary that transects the site. The West Range member, described as mainly gravel, exhibited an A-C

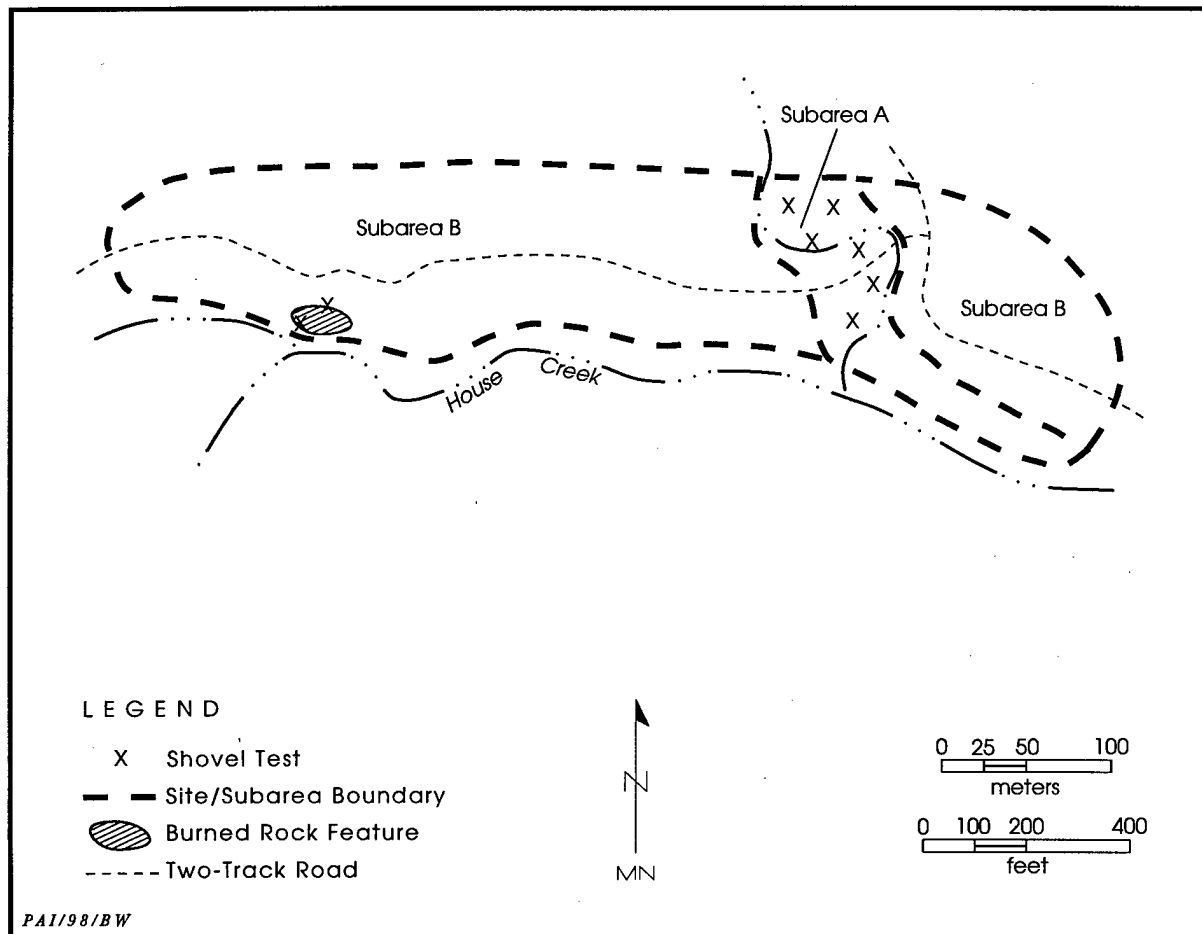


Figure 57. Site map, 41CV1221 (modified from Trierweiler, ed. 1994:A1360).

profile. Inset into and partially draping this unit was a cumulic, fine-grained fill with a thick A horizon (greater than 50 cm) that graded into a Bgss horizon. A thin veneer of Ford alluvium draped this unit and formed the current stream point bars. The surface was minimally disturbed by roads and recent cutbank erosion. Although no cultural materials were observed in Subarea A, shovel testing was recommended based on the age and depth of the Holocene alluvium.

Situated on the Pleistocene surface ( $T_2$ ) of House Creek, Subarea B encompassed the majority of the site area. The margin of this surface had been beveled by erosion adjacent to House Creek, with most of the soil stripped from the surface. The majority of the fill below the surface was correlated with the Jackson alluvium (Nordt 1992), with two facies observed. These included a coarse channel gravel facies and a fine-grained, presumably overbank facies within which a soil formed. The soil consisted of a A-Bt-C and A-Bt-Btk-R profiles, usually less than 70 cm thick. The surface of this subarea was heavily impacted by maneuver activity. The burned rock midden identified by previous investigators was re-located at the southwest margin of Subarea B. It measured 10 m in diameter, was highly vandalized, and rested on bedrock. With the exception of this feature, the investigators concluded that Subarea B had little potential for in situ archeological remains and that the Pleistocene terrace probably represented a palimpsest surface of cultural materials. Since the burned rock midden had the potential to contain intact deposits, shovel testing was warranted.

On 30 June 1992, a crew excavated six shovel tests in Subarea A and two shovel tests within the burned rock midden on Subarea B. All of the tests were excavated to 40 cm or bedrock. Only two of the shovel tests in Subarea A were positive, with total recovery consisting of a single flake found within each at 0–10 cm. Both of the tests placed within the burned rock midden were positive. The first of these was excavated to bedrock at 20 cm, with recovery consisting of four burned rocks at 0–10 cm. Excavated to 40 cm, recovery from the second test included 31 flakes and 57 burned rocks at 0–30 cm.

Based on the geomorphic observation of more than 3 m of deposits in Subarea A and the shovel test results in the burned rock midden in Subarea B, the investigators concluded that both

portions of the site had the potential to contain intact cultural deposits of unknown significance. A recommended testing effort included a minimum of four backhoe trenches in Subarea A and 2–4 m<sup>2</sup> of manually excavated test units within the burned rock midden in Subarea B (Trierweiler, ed. 1994:A1359–A1361).

### **Work Performed**

On 7 August 1996, Prewitt and Associates completed formal testing of Subareas A and B at site 41CV1221 (Figure 58). Three backhoe trenches (Backhoe Trenches 1–3) and two 1x1-m test units (Test Units 4 and 5) were excavated in Subarea A; three 1x1-m test units (Test Units 1–3) were excavated within or adjacent to the burned rock midden, designated Feature 1, in Subarea B. A total of 3.9 m<sup>3</sup> was manually excavated.

Oriented to 110°, Backhoe Trench 1 (8.5x0.8x1.1 m) was placed on the west side of the tributary that transects Subarea A; the trench was excavated to bedrock. Backhoe Trench 2 was placed just northeast of the confluence of the tributary and House Creek. The trench was oriented to 230° and had dimensions of 10.0x0.8x2.5 m. No cultural materials were observed in either trench. At the eastern margin of the subarea, Backhoe Trench 3 was placed adjacent to House Creek. Oriented to 210°, the trench measured 9.5x1.0x1.6 m. A few burned rocks and charcoal were located in the east profile at ca. 95 cm, and a large animal bone was exposed in the west profile at ca. 150 cm. Excavated to bedrock at 157 cm, Test Unit 4 was placed along the west wall of Backhoe Trench 3 above the large animal bone. Test Unit 5 was placed along the east wall of Backhoe Trench 3 over the exposed burned rocks; the excavation was terminated at 110 cm (basal gravels).

Test Units 1 and 3, excavated to dense gravels at 40 cm and 30 cm, respectively, were centrally (but not contiguously) placed on Feature 1 in Subarea B. Excavated to gravels at 50 cm, Test Unit 2 was placed approximately 10 m north of Test Unit 1 in an attempt to determine the extent of the feature. A Castroville dart point was collected from a spoil pile of Feature 1.

### **Site Extent and Depth**

Based on the scatter of surficial cultural

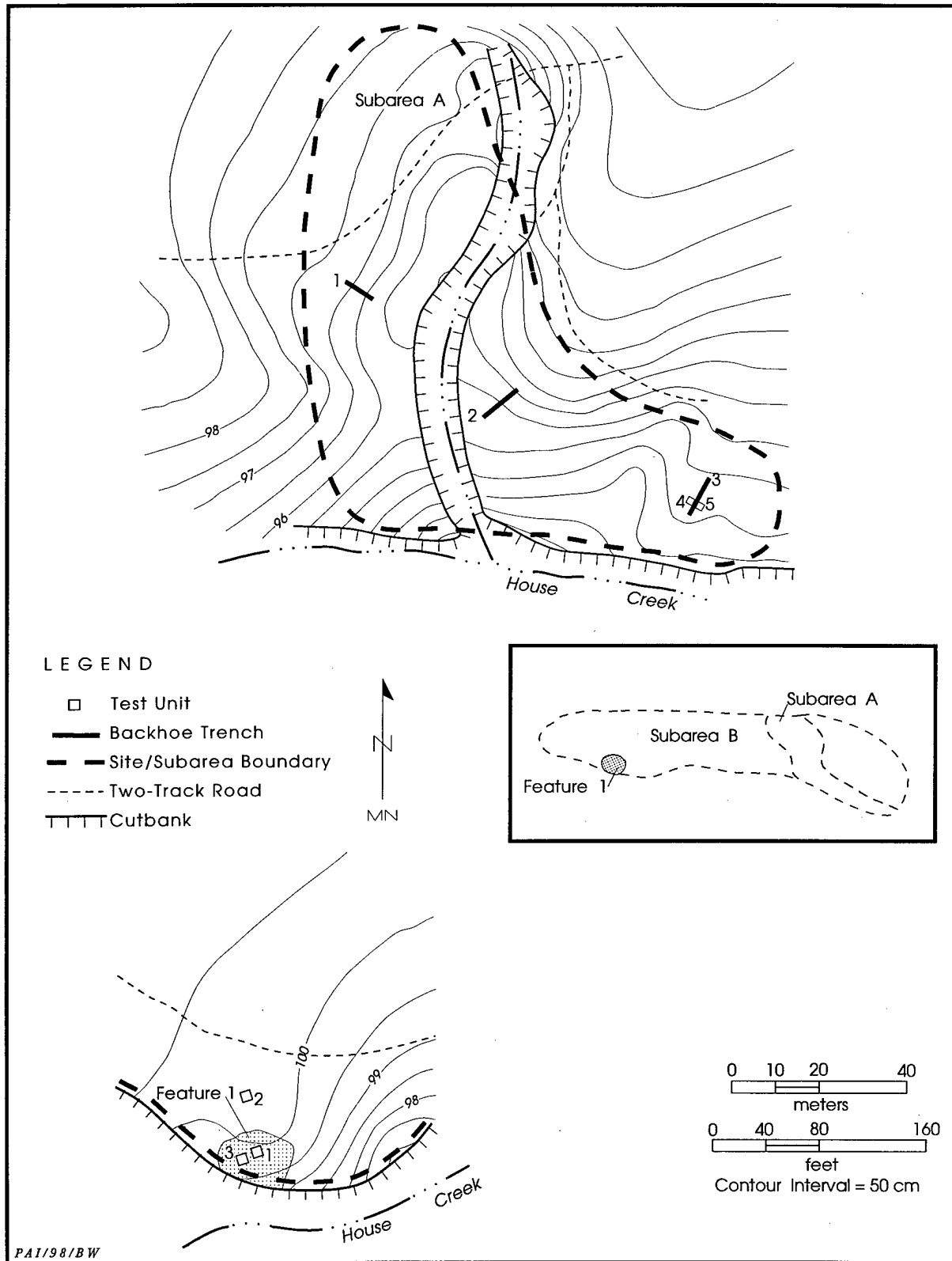


Figure 58. Maps of Subarea A and Feature 1 portion of Subarea B, 41CV1221.

materials and testing results, the overall site dimensions remain unchanged from previous investigations. Based on the presence of sparse cultural materials consisting of a burned rock, few faunal remains, and dispersed charcoal, it can be determined that vertically discrete components are not buried in Subarea A.

In Subarea B, Feature 1 is situated at the edge of the Pleistocene terrace immediately above a 7 m vertical cutbank of the tributary at the southwestern site boundary. The maximum dimensions of the feature, based on an inspection of natural and/or artificial (i.e., military excavation) exposures on all sides, were determined to be 17 m east-west by 10 m north-south. Adjacent to the cutbank, approximately 2 to 4 m of the feature had been highly impacted by erosional beveling and vandalism. From the west edge to the northern extremity, the feature appeared to have been traversed by vehicular traffic. Although the excavations encountered Feature 1 from the surface to a maximum depth of 30 cm, various impacts have severely disturbed the feature. In addition, the absence of internally discrete features within the thin midden deposit suggests that vertically discrete components are not distinguishable.

### **Sediments and Stratigraphy**

Backhoe Trenches 1 and 3 were examined in Subarea A, revealing a fill of Ford and probably lower West Range alluvium. The 108-cm-thick profile of Backhoe Trench 1 revealed dark, loamy Ford alluvium overlying a clast-supported fluvial gravel bed of presumably lower West Range age. One soil (A-Bw-Bw2 profile) is imprinted on the overlying fine-grained Ford deposit. The profile of Backhoe Trench 3 consists of dark, loamy to gravelly clay Ford alluvium (0–151 cm) overlying presumably gravelly lower West Range alluvium (151–155+ cm). Two soils (AC-2Ab-2Bwb-2C profile) were observed in this profile.

Subarea B is mantled by a thin (30–40 cm) dark loamy to clayey Jackson alluvium overlying a limestone bedrock strath.

### **Definition of Analysis Units**

Based on the presence of different terrace surfaces, two analysis units are defined. Analysis Unit 1 encompasses the lower Holocene terrace (T<sub>1</sub>), whereas Analysis Unit 2 corresponds to Feature 1 situated on the higher Pleistocene

terrace (T<sub>2</sub>).

### **Analysis Unit 1**

Since no intact cultural deposits were encountered, Analysis Unit 1 includes the Ford alluvium from the surface to a maximum depth of 107 cm, and the underlying West Range alluvial unit to a maximum depth of 2.5 m.

### **Cultural Materials**

Test Unit 4 produced four unmodified bones; three are unidentified fragments found at 90–100 cm and one is a partial cow or bison femur found at 129–146 cm. Although scattered charcoal was associated with these levels, the femur was found lying at a 45° angle within a dense layer of large gravels. The entire deposit became more gravelly with depth and the large bone was apparently washed in with the gravels.

Virtually no cultural materials were found in Test Unit 5 from surface to 110 cm. A single burned rock was found at 80–90 cm. Charcoal was noted in all but the first (0–10 cm) and last (100–110 cm) excavated levels. Charcoal collected at 80–90 cm yielded a radiocarbon age of 180 ± 40 B.P. (Beta 102130, see Appendix A). This assay indicates that the deposit is basically modern.

### **Discussion**

The test excavations indicate that no intact, vertically discrete cultural deposits are buried in the lower terrace. This is demonstrated by the paucity of prehistoric cultural materials and the presence of a large bone presumably redeposited within a gravelly matrix. A calibrated radiocarbon charcoal date of A.D. 1665 (1675) 1690, 1735 (1770, 1800) 1815, and 1925 (1940) 1950 suggests that the deposits and associated materials are historic to modern in origin.

### **Analysis Unit 2**

Analysis Unit 2 is restricted to the burned rock midden (Feature 1) located near the edge of the Pleistocene terrace overlooking House Creek and one of its tributaries. Based on an inspection of natural and artificial (i.e., military excavation) exposures and the testing results, the maximum feature dimensions are estimated to be 17 m east-

west, 10 m north-south, and 0.3 m thick.

### Cultural Materials

A total of 720 artifacts were recovered from Analysis Unit 2 (Table 24). The upper 30 cm of matrix in Test Units 1 and 3 consisted of Feature 1, which produced dense amounts of cultural materials (see Cultural Features). The only artifacts recovered from nonfeature fill in these units were 5 flakes and 1 early to middle stage biface from 30–40 cm in Test Unit 1. The midden deposit was not present in Test Unit 2, which was excavated from 0–40 cm and produced 37 small burned rocks (3 kg) and 31 flakes. Level 5 (40–50 cm) was culturally sterile.

### Cultural Feature

Feature 1 was encountered across Test Units 1 and 3 from 0–30 cm. In Test Unit 1, Feature 1

contained 277 burned rocks (67 kg), 467 flakes, 1 core, and 10 lithic tools, including a Provisional Type I point found at 16 cm. The upper 10 cm of deposit also contained glass fragments. A processed flotation sample yielded sparse microdebitage. In Test Unit 3, Feature 1 produced 719 burned rocks (66.5 kg), 200 flakes, and 4 lithic tools (including 2 untypeable dart points). Intrusive cartridge cases were also found from 0–10 cm. Although not submitted for macrobotanical analysis, processed flotation samples collected at 10–20 cm and 20–30 cm contained minimal amounts of microdebitage, and charred wood and seeds.

Feature 1 is a dense burned rock midden with copious amounts of lithic artifacts. The overwhelming majority of burned rocks were very blocky, angular pieces of limestone, with the largest single one being an unfractured, subrounded, tabular rock weighing 2.5 kg. No discrete, internal features were encountered within the midden

Table 24. Summary of cultural materials from 41CV1221, Analysis Unit 2

Provenience	Dart Points	Bifaces	Miscellaneous Unifaces	Spokeshave	Core Tool	Edge-modified Flakes	Core	Unmodified Debitage	Totals
<b>TEST UNIT 1</b>									
Feature 1 (0–10 cm)	–	1	2	1	–	–	–	139	143
Feature 1 (10–20 cm)	1	1	2	–	1	1	–	166	172
Feature 1 (20–30 cm)	–	–	–	–	–	–	1	162	163
Level 4 (30–40 cm)	–	1	–	–	–	–	–	5	6
Subtotals	1	3	4	1	1	1	1	472	484
<b>TEST UNIT 2</b>									
Level 1 (0–10 cm)	–	–	–	–	–	–	–	5	5
Level 2 (10–20 cm)	–	–	–	–	–	–	–	10	10
Level 3 (20–30 cm)	–	–	–	–	–	–	–	10	10
Level 4 (30–40 cm)	–	–	–	–	–	–	–	6	6
Level 5 (40–50 cm)	–	–	–	–	–	–	–	–	0
Subtotals	0	0	0	0	0	0	0	31	31
<b>TEST UNIT 3</b>									
Feature 1 (0–10 cm)	–	–	1	–	–	–	–	18	19
Feature 1 (10–20 cm)	2	–	–	–	–	–	–	152	154
Feature 1 (20–30 cm)	–	–	–	–	–	1	–	30	31
Subtotals	2	0	1	0	0	1	0	200	204
<b>FEATURE 1</b>									
Backdirt Pile	1	0	0	0	0	0	0	0	1
Totals	4	3	5	1	1	2	1	703	720

matrix. One Castroville point surface collected from an old pothunter's backdirt pile presumably came from within the midden.

### **Discussion**

Although Feature 1 covers about 170 m<sup>2</sup> and has a maximum thickness of 30 cm, various impacts have severely disturbed a large portion of the midden. Mixed deposits are present from 0–10 cm based on the occurrence of modern intrusive items. In addition, 2 to 4 m of the feature adjacent to the edge of the terrace has been heavily impacted by vandalism and erosional beveling. Along its west edge to the northern extremity, the feature has been intensively traversed by vehicular traffic.

### **Summary and Conclusions**

No isolable cultural deposits were encountered in either the lower Holocene terrace (T<sub>1</sub>) or the higher terrace (T<sub>2</sub>) encompassing Feature 1, the burned rock midden. The chronometric data (A.D. 1665–1950) and secondary context of recent large mammalian bones indicate that the deposits in the lower terrace lack contextual integrity. On the Pleistocene terrace, Feature 1 rests on a stable landform and probably represents a palimpsest. The ubiquity of disturbance indicates that the feature's contextual integrity has been severely compromised. Based on the foregoing, the potential for in situ, isolable components is considered virtually negligible. Based on the testing results, this site is recommended as not eligible for listing in the NRHP.

### **41CV1222**

#### **Site Setting**

Site 41CV1222 is situated near the confluence of House and Ripstein creeks, with House Creek bounding the site on the east and south and Ripstein Creek bounding it on the northwest (Figure 59). The site extends southwest from the confluence, across the T<sub>0</sub> and T<sub>1</sub> terraces of these creeks, to the base of a denuded toeslope. Although the floodplain (T<sub>0</sub>) has been somewhat disturbed by vehicular traffic and cut-bank erosion, the T<sub>1</sub> surface has been extensively modified by agricultural use and military activities. A rock wall separates these two terraces.

The floodplain is covered by a hardwood-juniper-oak forest, while the T<sub>1</sub> terrace consists of an open grassy field. Site elevation is 270 m above mean sea level.

### **Previous Work**

Dureka, McCabe, and Frye (Texas A&M University) recorded the site on 8 May 1986 as a lithic and burned rock scatter. Site dimensions were defined as 290 m east-west by 190 m north-south. A Pedernales point was collected during the survey. Disturbances resulting from erosion and cattle were estimated to have impacted 15 percent of the site.

The site was revisited in April 1992 by Truesdale and Doering (Mariah Associates) for archeological and geomorphological reconnaissance and assessment. Site dimensions were altered to 280 m east-west by 225 m north-south. The 2.5–3-m alluvial fill contained within the two surficial facies consisted of 1–1.5 m of fine-grained sediments (clay loam) overlying coarse river gravels forming a weak A-Bt-C profile and was thought to correlate with the Fort Hood alluvium (Nordt 1992). One untyped dart point was collected from the surface.

This investigation included the excavation of 48 shovel tests to a maximum depth of 60 cm. Eleven (22.9 percent) of these tests were positive; recovery consisted of 73 items (10 flakes, 2 metal cans, and 61 presumably burned rocks) found from 0–40 cm. The lithic artifacts were fairly evenly distributed in this upper 40 cm of fill. The 2 recent cans were found from 10–20 cm, suggesting that the deposits had been disturbed in various places on the site. Site 41CV1222 was evaluated as having the potential for containing intact cultural deposits of unknown significance. A minimum testing effort of 7 m<sup>2</sup> of manually excavated test pits and 7 backhoe trenches was recommended to determine the National Register eligibility of the site (Trierweiler, ed. 1994: A1362–A1364).

### **Work Performed**

On 13 September 1996, Prewitt and Associates completed formal testing of 41CV1222. A series of six backhoe trenches (Backhoe Trenches 1–6), four 1x1-m test units (Test Units 1–3 and 5), and one 50x50-cm test unit (Test Unit 4) were excavated. A total of 2.8 m<sup>3</sup> was manually dug.

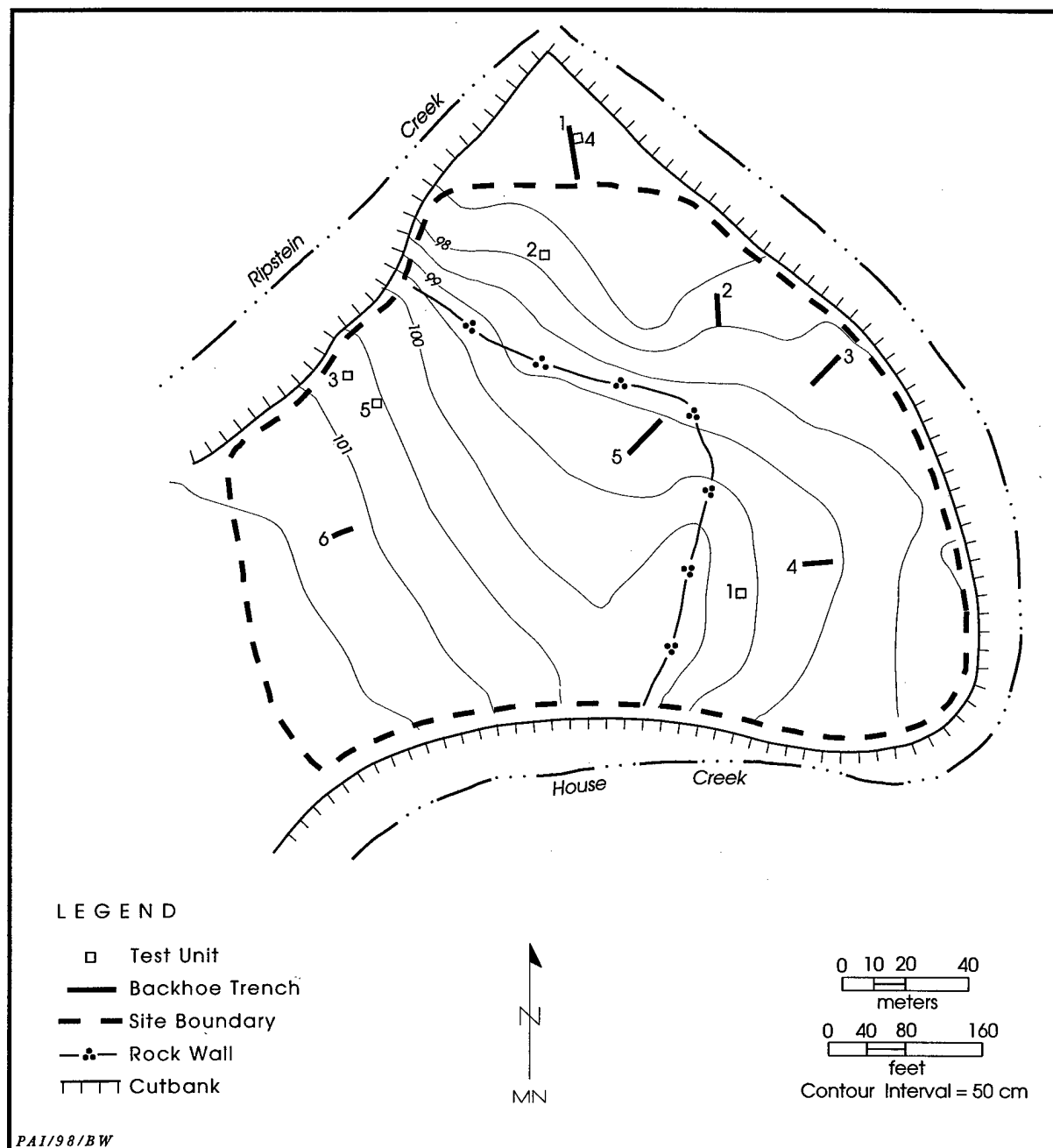


Figure 59. Site map, 41CV1222.

Of the six backhoe trenches excavated on the site (ranging in size from 7–18 m long, 1.3–3.3 m deep, and 0.8 or 1.5 m wide), four were situated on the floodplain (Backhoe Trenches 1–4) and two (Backhoe Trenches 5–6) were on the upper ( $T_1$ ) terrace (see Figure 59). Backhoe Trenches 1–5 were sterile, and only a few burned

rocks were observed in disturbed sediments in Backhoe Trench 6 just below the ground surface.

Test Units 1, 2, and 4 were placed on the lower terrace. Test Units 1 and 2 were excavated to dense gravels at 40 cm, and Test Unit 4 was excavated to the water table at 280 cm. Test Units 3 and 5 were placed on the upper  $T_1$  terrace



and excavated to dense gravels at 80 cm and 50 cm, respectively. With the exception of Test Unit 4, placed along and oriented with the east wall (350° magnetic north) of Backhoe Trench 1, the test units were isolated from the backhoe trenches and oriented to magnetic north.

### **Site Extent and Depth**

Site 41CV1222 covers an area of ca. 230x230 m. Within the floodplain sediments, cultural artifacts were found at 10–30 cm in Test Unit 1, at 0–20 cm in Test Unit 2, and at 130–140 cm in Test Unit 4. In the upper  $T_1$  fill, cultural artifacts were found at 0–60 cm in Test Unit 3 and in the upper 40 cm of Test Unit 5.

### **Sediments and Stratigraphy**

The profiles of five of the six backhoe trenches revealed three Holocene alluvial fills laterally inset to each other and underlying the upper  $T_1$  and lower  $T_0$  terrace surfaces (Figure 60). Backhoe Trenches 1–4 were placed on the  $T_0$  surface or floodplain, revealing Ford and lower West Range alluvial deposits. The 197-cm-thick profile of Backhoe Trench 1 consists of a series of soils (A-C-2ABb-3Ab-3Bwb) imprinted on dark loamy and gravelly Ford alluvium. Backhoe Trench 2 revealed a Ford alluvial fill (0–216+ cm) consisting of interbedded gravelly and loamy deposits. One soil (A-Bwk-C profile) was observed in this fill. The 144-cm-thick profile of Backhoe Trench 4 consists of a gravelly Ford alluvium (0–142 cm) overlying a probable deposit of gravelly lower West Range alluvium. An A-Bw-C profile has formed on the overlying Ford fill, while a truncated soil (2Bwb horizon) is present in the lower West Range fill.

The profiles of Backhoe Trenches 5 and 6 reveal that the upper terrace surface is diachronous. A thin drape of Ford alluvium mantles the edge of the  $T_1$  surface and is laterally inset to the lower West Range and Fort Hood deposits. The 310-cm-thick profile of Backhoe Trench 5 consists of a dark, fine-grained Ford alluvial drape overlying a gravelly lower West Range alluvium. An A-Bw soil profile has formed in the Ford-age sediments. The Ford drape buries a 2Ab-2Bwb-2Bwb2 soil formed on the underlying lower West Range alluvium. The 114-cm-thick profile of Backhoe Trench 6 consists of loamy and gravelly deposits of the Fort Hood

alluvium with one soil (A-Bw-C profile) imprint.

### **Definition and Interpretation of Analysis Units**

Two analysis units are defined for the site. Analysis Unit 1 consists of the Ford deposits underlying the floodplain, and Analysis Unit 2 consists of the lower West Range and Fort Hood alluvium underlying the upper ( $T_1$ ) terrace.

#### **Analysis Unit 1**

##### ***Cultural Materials***

Total recovery from Test Unit 1 consisted of two flakes and three small burned rocks; only four flakes were found in Test Unit 2, and one burned rock was found in Test Unit 4. Although only one artifact was found in Test Unit 4, charcoal flecking was observed in about half of the levels from 90–270 cm.

##### ***Discussion***

Low amounts of lithic debitage and burned rocks are the only cultural artifacts discovered in Analysis Unit 1. No diagnostics or subsistence remains were found, and no cultural features or intact evidence of discrete occupations were identified. Thus, Analysis Unit 1 is considered to have limited research potential.

#### **Analysis Unit 2**

##### ***Cultural Materials***

Recovery from Test Unit 3 included 32 flakes, 1 edge-modified flake, 23 (6 kg) burned rocks, and a Pedernales point (from 10–20 cm). Recovery from Test Unit 5 consisted of 13 flakes and 8 (0.55 kg) small burned rocks.

##### ***Discussion***

The recovery of a Pedernales point suggests that the cultural materials recovered from Analysis Unit 2 are representative of Late Archaic occupations. However, the vast majority of these artifacts were found in the upper 20 cm of the terrace sediments, which have been completely disturbed by agricultural and military activities. Neither mechanical nor hand

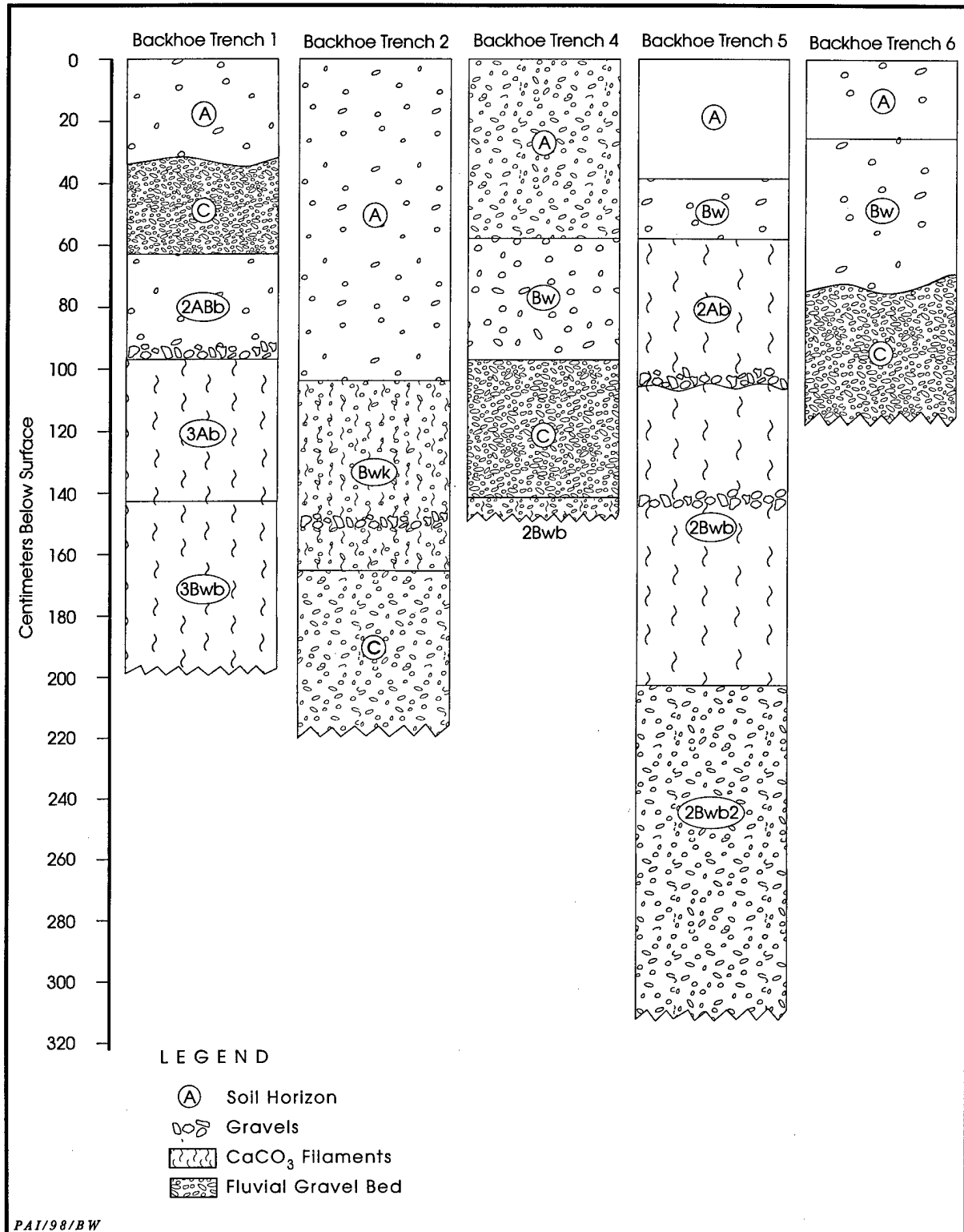


Figure 60. Profiles of Backhoe Trenches 1, 2, and 4-6, 41CV1222.

excavations exposed any intact buried cultural deposits or features, and no subsistence remains were found. Given the amount of disturbance and paucity of buried cultural materials, the research potential of not only Analysis Unit 2, but the entire site, is limited.

#### 41CV1225

#### Site Setting

Site 41CV1225 is situated on terraces north-east of House Creek (Figure 61). A northwest-

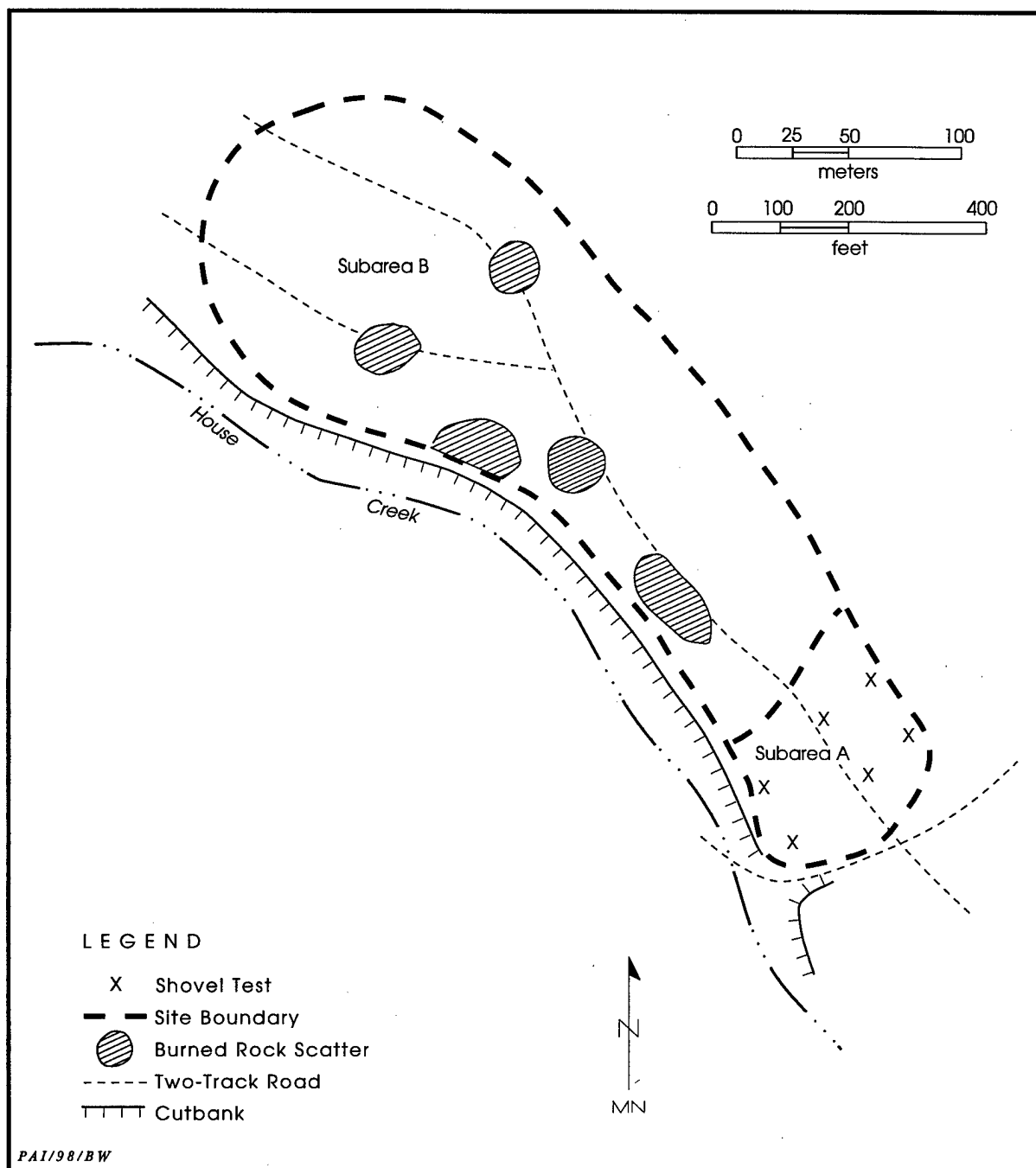


Figure 61. Site map, 41CV1225 (modified from Trierweiler, ed. 1994:A1366).

southeast-oriented road parallels the drainage. Most of the site area is open and covered with grasses; juniper, oak, and pecan trees are adjacent to the cutbank. Site elevation is 250 m above mean sea level.

### **Previous Work**

Hoffman, Dureka, and Mesrobian (Texas A&M University) recorded the site on 10 May 1986. Burned rock concentrations and scatters, in addition to sparse lithic artifacts, were noted across an area measuring 415 m northwest-southeast by 140 m northeast-southwest. Two untyped dart points were collected. An estimated 60 percent of the site was disturbed by erosion, tracked vehicles, and cattle.

On 10 June 1992, Trierweiler and Frederick (Mariah Associates) revisited the site. Maximum site dimensions were reduced to 400 m northwest-southeast by 120 m northeast-southwest. Most of the area was once cultivated. The site was divided into two subareas based on geomorphic contexts and archeological potential. Subarea A consisted of the  $T_1$  surface approximately 6–8 m above the House Creek thalweg. The Fort Hood and West Range alluvial units (Nordt 1992) appeared to underlie this surface. Present at the southernmost end of the site, the West Range alluvium was identified on the basis of an A-Bw or Bk soil profile. This terrace deposit apparently lapped onto an older fill that exhibited an A-Btk-K soil profile tentatively identified as Fort Hood alluvium. A thin scatter of debitage and burned rocks was noted across the surface. Based on the potential for buried cultural deposits, shovel testing was recommended.

Subarea B encompassed the majority of the site and included an outcrop of gravelly Jackson alluvium that mantled two constructional surfaces about 10–12 m above the House Creek channel. The soil formed within the Jackson alluvium exhibited an A-K or A-Btk-K profile. Several burned rock features were observed on the Pleistocene terrace, but all were deflated and heavily impacted by vehicular traffic. One large midden, originally located in a road at the southern end of Subarea B, was completely disturbed and redeposited by heavy equipment. Overall, scattered burned rocks and debitage were thinly distributed across the subarea. Since Subarea B contained surficial and palimpsest deposits in

disturbed contexts, shovel testing was not warranted.

On 10 July 1992, a crew excavated six shovel tests in Subarea A. Only one shovel test (16.7 percent) was positive, producing a total of 10 flakes at 10–30 cm. Based on the shovel test results and the depth of the Holocene-age alluvium, Subarea A was evaluated as having the potential to contain cultural deposits eligible for nomination to the NRHP. The recommended testing effort included a minimum of four backhoe trenches and 4 m<sup>2</sup> of manually excavated test units (Trierweiler, ed. 1994:A1365–A1367).

### **Work Performed**

On 5 September 1996, Prewitt and Associates completed formal testing of Subarea A at site 41CV1225 (Figure 62). The test excavations included five backhoe trenches (Backhoe Trenches 1–5) and three test units (Test Units 1–3). A total of 2.3 m<sup>3</sup> was manually excavated. One reworked Pedernales point was collected from the surface of Subarea B.

Excavated parallel to House Creek, Backhoe Trench 1 (13.0x0.8x0.7 m) was oriented to 50°; no cultural materials were encountered. Oriented to 350°, Backhoe Trench 2 (13.0x0.8x1.7 m) was placed 35 m east-northeast of Backhoe Trench 1. Sparse cultural materials were exposed from the surface to 70 cm. Approximately 35 m east of the cutbank, Backhoe Trench 3 was located 40–45 m northeast and northwest of Backhoe Trenches 1 and 2, respectively. The trench measured 12.0x1.5x2.5 m and was oriented to 59°. Backhoe Trench 4 was situated approximately 70 m east of the cutbank, 25 m north of Backhoe Trench 2, and 25 m southeast of Backhoe Trench 3. Oriented to 37°, the trench had dimensions of 10.0x0.8x1.9 m. Situated 40 m southeast of Backhoe Trench 2, Backhoe Trench 5 measured 12.0x1.5x3.0 m and was oriented to 80°. No cultural materials were encountered in Backhoe Trenches 3–5.

Test Unit 1 (1x1 m) was located along the west wall of Backhoe Trench 2 and above a few burned rocks exposed at 50–70 cm. The excavation was terminated at 110 cm. Test Unit 2 (1.0x0.5 m) was placed on the safety bench along the south wall of Backhoe Trench 5. Levels 1 through 16 were removed by the backhoe while trenching. Manual excavation began at Level 17 (160–170 cm) and was halted at 260 cm. Situated

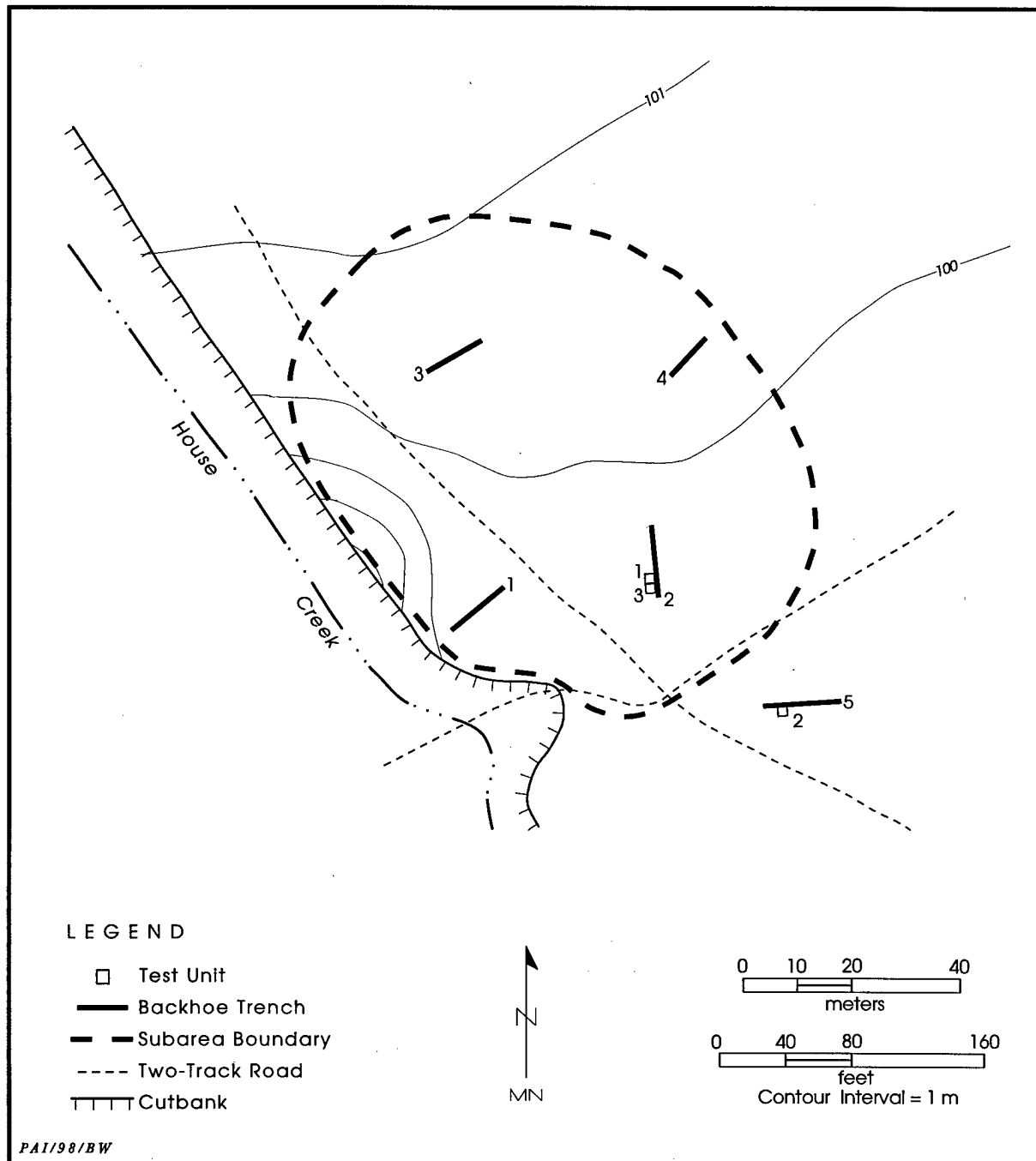


Figure 62. Map of Subarea A, 41CV1225.

along the west wall of Backhoe Trench 2, Test Unit 3 (1x1 m) was contiguous with (south of) Test Unit 1. Based on a paucity of artifacts in Test Unit 1, the upper 20 cm of deposits were removed without screening. The unit was excavated to 70 cm.

#### Site Extent and Depth

The  $T_1$  surface is delimited by House Creek to the west and the higher  $T_2$  surface to the north. However, the Holocene-age terrace extends an unknown distance to the south and

east. Based on previous investigations and the testing results, the maximum dimensions of the T<sub>1</sub> surface are 100 m northwest-southeast by 80 m northeast-southwest. Although cultural materials were found from the surface to a maximum depth of 70 cm, vertically discrete cultural deposits could not be isolated.

### **Sediments and Stratigraphy**

Three backhoe trenches were examined in Subarea A. The 68-cm-thick profile of Backhoe Trench 1 consists of a gravelly alluvial deposit imprinted with one soil (A-Ck-Ck2 profile). The A horizon, a very dark grayish brown very gravelly silty clay loam, has formed on a lower West Range alluvium. However, the age of the underlying deposit(s) is unclear. The slightly cemented nature of the underlying clast-supported gravel bed (21–50 cm) suggests an age of great antiquity, but the elevation of the deposit(s) above House Creek is 2–6 m lower than the late Pleistocene-age T<sub>2</sub> surface. It is likely that the basal deposits represent the lower West Range or a gravelly Fort Hood facies that has been locally cemented through the diagenetic alteration of limestone gravels due to groundwater fluctuations.

Backhoe Trench 3 consists of a 224-cm-thick profile of lower West Range and Fort Hood alluvium. The contact between the two alluvial fills is not clear due to pedogenic development and the welding together of the two alluvial units. Two soils (A-2Ab-2Bwb profile) are imprinted on the lower West Range fill. Backhoe Trench 5 consists of a 289-cm-thick profile of lower West Range and Fort Hood alluvium imprinted with an A-B-Bwk-2Bwb soil profile. As in Backhoe Trench 3, a clear distinction between the lower West Range and the underlying Fort Hood alluvium could not be made. It is probable that the truncated dark yellowish brown gravelly silty clay loam 2Bwb horizon is imprinted on Fort Hood alluvium.

### **Cultural Materials**

A total of 53 flakes and 21 burned rocks (4.25 kg) were found in Test Unit 1 from the surface to 70 cm. Approximately 72 percent of these cultural materials were recovered from 30–60 cm. Test Unit 3 produced 18 flakes and 27 small burned rocks (2.25 kg) at 20–70 cm, with

counts ranging between 6 and 14 items per level. Test Unit 2 yielded no cultural materials.

### **Discussion**

The testing results indicate that cultural materials are present throughout the upper 70 cm of deposit, which has been interpreted as the lower West Range alluvial unit. Isolable, stratigraphically discrete cultural deposits, however, cannot be distinguished. These findings suggest that buried intact archeological components are not present. Based on the testing results, this site is recommended as ineligible for listing in the NRHP.

Although no evidence of disturbance was apparent in the upper 20 cm of deposit, the entire terrace has been cleared, impacted by roads and tracked vehicles, and at one time probably cultivated. Thus, the contextual integrity of these sediments and the cultural materials contained therein has been compromised. Due to the presence of moderate amounts of cultural materials throughout Test Units 1 and 3 at 20–70 cm (lower West Range alluvium), discrete components cannot be isolated. This, along with the absence of deeply buried cultural deposits, indicates that the research potential of 41CV1225 is extremely limited.

### **41CV1235**

#### **Site Setting**

Site 41CV1235 is situated on a series of terraces west of House Creek and north of an unnamed tributary. Located at the middle of the site, a southeasterly flowing drainage bisects the terrace. In addition, a north-south tank trail parallels House Creek and an east-west tank trail spans the entire length of the site. Most of the area is open and covered with grasses. The densest vegetation is adjacent to the drainages and also occurs in isolated stands near the northwest site margin. The growth consists primarily of mixed riparian hardwoods including pecan and burr oak trees in addition to junipers and a thick understory. Site elevation is 250 m above mean sea level.

#### **Previous Work**

On 14 May 1986, Mehalchick, Dureka, Davis,

and Rotunno (Texas A&M University) recorded the 300x145-m site. A tank trail had exposed a large burned rock midden, approximately 150 m long, 30 m wide, and 0.5 m thick. The midden contained dense amounts of burned rocks, snail shells, and lithic artifacts; the potential for faunal preservation was considered high. Six of eight collected projectile points were recovered from the surface of the midden, but none were described. Immediate action was recommended to preserve and protect the site. An estimated 70 percent of the site was disturbed by vehicular traffic and erosion.

In November 1991, Kimball Smith (Fort Hood Archeologist) revisited the site and noted that the midden contained a "dense, hard, black underlayer studded with *Rabdotus*." In general, the site's condition was the same as when first recorded; however, several vandalized areas were observed, including "two small pits dating no earlier than fall of 1990." West Range and Ford alluvial fills were identified and three dart points (a Pedernales, a Bulverde, and a Darl-like specimen) were collected.

On 10 June 1992, Trierweiler and Frederick (Mariah Associates) revisited the site. Based on the areal extent of cultural materials, the site dimensions were reduced slightly to 270x120 m. The site was situated primarily on the T<sub>2</sub> and T<sub>1</sub> surfaces west of House Creek. The modern floodplains (T<sub>0</sub>) of House Creek and its tributary were present along the eastern and southern site margins, respectively. A broad, low-relief gully trended northwest across the central portion of the site and graded to the unnamed tributary. This gully may have formed initially as a high-magnitude flood channel that later cut headward (or upstream) across the T<sub>1</sub> surface.

Multiple alluvial fills were noted. The T<sub>0</sub> floodplains consisted of Ford alluvium, but the majority of the site appeared to be a T<sub>1</sub> surface underlain by the West Range alluvium (Nordt 1992). Identification of the major fill was hindered by the lack of vertical exposures and dense vegetation. This Holocene-age fill lapped onto the margin of the T<sub>2</sub>, which was locally underlain by the Jackson alluvium. Erosion near the western end of the site provided an excellent exposure of an A-Bk soil formed within the Jackson fill. The majority of the cultural materials here appeared to rest on the gently sloping, beveled margin of the Jackson alluvium or were shallowly buried within the upper 50 cm

of an inset Holocene alluvium. This fill appeared to have an A-Bk profile where the Bk horizon was weakly expressed, unlike the Jackson alluvium where the Bk horizon exhibited pedogenic carbonate nodules up to 1.5 cm in diameter.

Two burned rock middens, partially mantled with a thin alluvial veneer, were identified. These two features, one at the western end of the site and one near the east-central portion, were located at opposite ends of what the original investigators called a "150-m-long" midden. At the western end of the site, Feature 1 (70x25 m and 50 cm thick) contained dense amounts of cultural materials. This midden was severely impacted by a road and numerous potholes, some of which appeared to be very recent. The dark midden deposits were actively eroding down-slope, across the road and into a gully. Previous investigators noted midden deposits within this gully in 1986, but the cultural materials in this area were probably redeposited by sheet erosion. Near the eastern site boundary, the Feature 2 midden was similar to Feature 1 except that it appeared to be only minimally impacted by the tank trail.

The 1991 site map also depicts a third burned rock midden just beyond the southwest boundary of the site. Although not assigned a feature number, it was mapped as an arc-shaped feature 100 m long and 12 m wide. This 50-cm-thick midden was noted as being similar to Feature 1. In addition, burned rocks were observed eroding from the south bank (opposite the site) of the unnamed tributary and in potholes at the foot of the limestone bluff on the terrace south of the drainage. Due to the potential for buried cultural materials, shovel testing was recommended.

On 9 July 1992, a crew excavated 26 shovel tests, of which 14 were positive. On Feature 1, 2 shovel tests excavated to 40 cm yielded dense amounts of cultural materials. In 3 tests excavated to 40 cm on Feature 2, the highest artifact frequencies were confined to the upper 20 cm. The other 9 positive tests yielded sparse cultural materials from the surface to a maximum depth of 50 cm. No shovel tests were placed in the "third midden area" depicted just beyond the site boundary on the sketch map. The results indicated that the site might contain intact cultural deposits of unknown significance which might be eligible for National Register nomination. The recommended testing effort included 7-8

backhoe trenches and 8–10 m<sup>2</sup> of manually excavated test units (Trierweiler, ed. 1994:A1372–A1375).

### **Work Performed**

Prior to beginning excavations, the site area was reinspected and Features 1 and 2 were re-located. Feature 1 is discussed in further detail (see Cultural Features), whereas Feature 2 appeared unchanged since its original recording. The previously recorded third burned rock midden just southwest of the site was not re-located. Although it reportedly measured about 100 m long, no evidence of this arc-shaped, elongated feature was found. Three military trenches were noted, but no cultural materials were observed in or around them.

On 16 September 1996, Prewitt and Associates completed formal testing of 41CV1235 (Figure 63). The test excavations included six backhoe trenches (Backhoe Trenches 1–6) and five test units (Test Units 1–5). Four test units measured 1x1 m, but Test Unit 3 had maximum excavated dimensions of 1.0x0.7 m. Each test unit was terminated at an arbitrary depth, with a total of 11 m<sup>3</sup> manually excavated.

Placed on the T<sub>0</sub> surface 10–15 m southeast of Feature 2, Backhoe Trench 1 measured 12.0x0.8x2.7 m and was oriented to 280°. Sparse burned rocks were scattered in the upper 10 cm of deposit.

Backhoe Trench 2 was excavated on the T<sub>1</sub> surface 25–30 m northwest of the center of Feature 2 and 25 m northeast of the drainage located at the center of the site. Oriented to 23°, the trench measured 14.0x1.5x2.6 m. At approximately 175 cm, a probable feature consisting of charcoal flecks and oxidized soil among burned rocks was exposed in the west wall of the trench's safety bench.

Approximately 12 m west of the central tributary, Backhoe Trench 3 was excavated in an erosional chute. The trench was oriented to 264° and measured 12.0x1.5x3.0 m. Scattered burned rocks were observed in the upper 50 cm of deposits at the west end of the trench. In addition, a few burned rocks were exposed at ca. 220 cm in the south wall at the east end of the trench.

Oriented to 265°, Backhoe Trench 4 (12.0x1.5x2.6 m) was situated on the T<sub>1</sub> surface about 25 m north of Feature 1. Although burned

rocks, debitage, and bones were exposed from 0–70 cm in the trench walls, the greatest density of cultural materials occurred from 30–70 cm. One Pedernales point, one untypeable dart point, seven long bone fragments of a large mammal, one pronghorn/deer element, four late-stage to finished bifaces, and one end/side scraper were collected from the backdirt.

Placed at the southwest margin of the site, Backhoe Trench 5 was situated on the toeslope 10–15 m south of the vandalized portion of Feature 1 where dense amounts of cultural materials are visible. Oriented to 15°, the trench had maximum dimensions of 18.0x0.8x2.4 m. Midden deposits associated with Feature 1 were exposed in all of the walls across the length of the trench; large quantities of burned rocks and lithic artifacts were observed. A Pedernales point of nonlocal chert was collected at 42 cm from the west wall of the trench near its downslope (northern) end. It is associated with Feature 1 and is made of nonlocal chert (see Cultural Features).

The midden generally extends from 10 cm to a maximum depth of 138 cm in Backhoe Trench 5, although the amount of sediment overlying Feature 1 varies considerably. At the midpoint of the trench, approximately 15 cm of sediment overlies the midden, but this sediment drape thickens to 50–60 cm at the southern end of the trench as the colluvial wedge, which encapsulates Feature 1, thickens upslope against the valley wall.

Below the midden deposit at approximately 80 cm, two probable burned rock features were visible in the west wall at the upslope end of the Backhoe Trench 5 (one was later designated Feature 5). Also near the upslope end of the trench, a Dawson point was collected from the west wall at 101 cm. In the east and west walls of the trench, another burned rock feature was exposed at about 120 cm (later designated Feature 7). One late-stage to finished biface was collected from the trench's backdirt.

Backhoe Trench 6 was located on the T<sub>1</sub> ca. 50 m east of Backhoe Trench 5. Oriented to 10°, the trench measured 12.0x0.8x2.5 m and contained a few burned rocks at ca. 180 cm.

Test Units 1 and 2 were contiguous units situated along the west wall of Backhoe Trench 5 above Feature 1 and two of the burned rock features exposed below the midden. Test Unit 2 was downslope (north) of Test Unit 1; both units



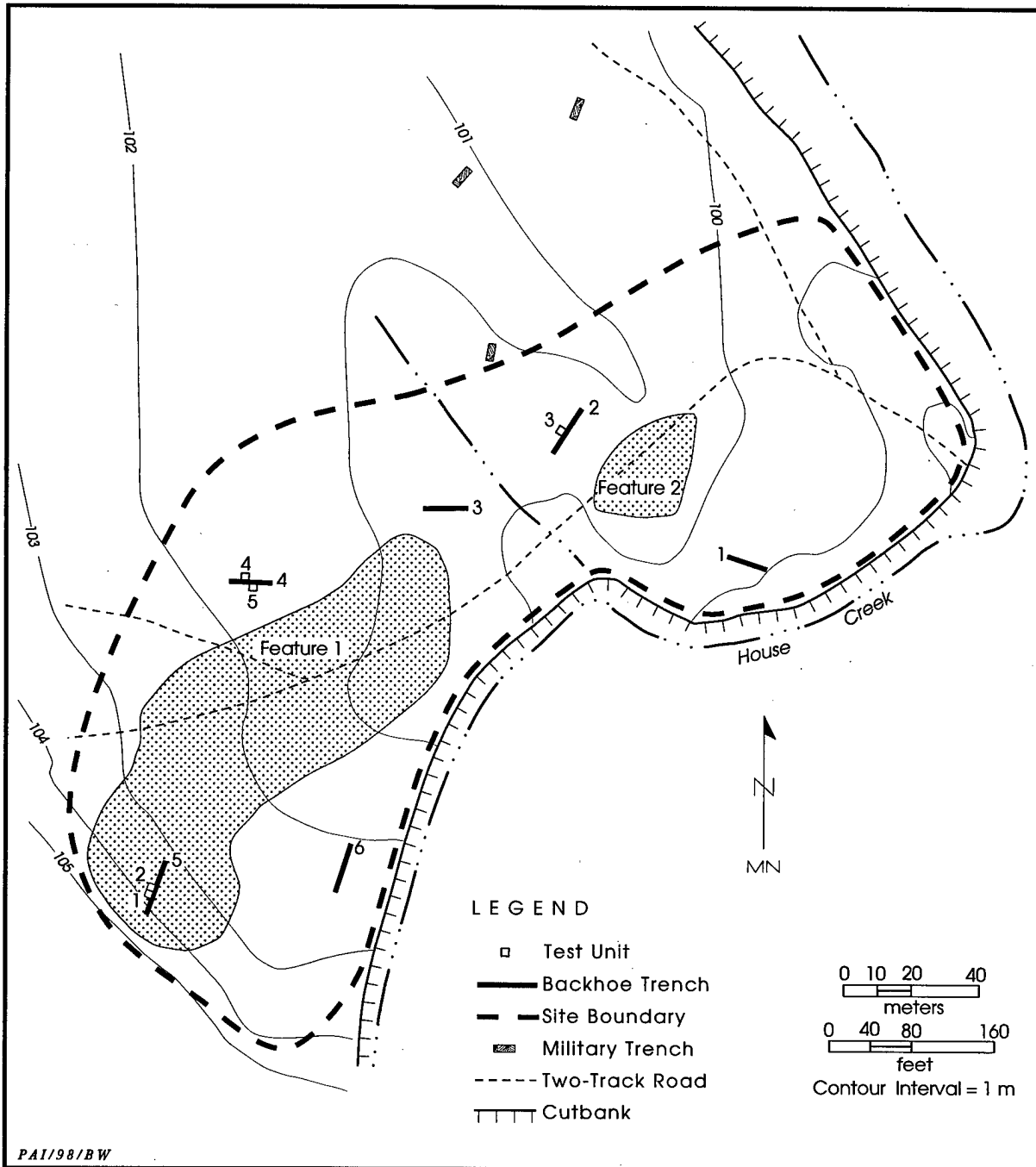


Figure 63. Site map, 41CV1235.

were excavated to 140 cm.

Placed on the safety bench adjacent to the west wall of Backhoe Trench 2, Test Unit 3 was situated over the burned rock feature exposed at ca. 175 cm. Since the upper 125 cm of deposit was removed during trenching, the test excava-

tion began with Level 13 (125–130 cm). This excavation was terminated at 200 cm.

Situated along the north wall of Backhoe Trench 4 near the western end of the trench, Test Unit 4 was placed above a distinct lens of cultural materials exposed at approximately

55 cm. Excavation of this unit was halted at 100 cm.

Located about 5 m east of Test Unit 4, Test Unit 5 was placed adjacent to the south wall of Backhoe Trench 4 above a lens of burned rocks exposed at 60 cm. This test unit was excavated to 160 cm.

### Site Extent and Depth

The site is delimited by House Creek to the east and an unnamed tributary and toeslope to the south. However, the terrace continues an unknown distance to the west and north. Based on the exposure of cultural materials and testing results, site dimensions are 315x100 m. The presence of a substantive midden deposit and six discrete burned rock features indicates that multiple occupations are buried within the toeslope and alluvial terrace ( $T_1$ ).

### Sediments and Stratigraphy

The sediments and stratigraphy of site 41CV1235 were determined through examination of the profiles of four backhoe trenches (Backhoe Trenches 1, 3-5) (see Appendix B). These investigations revealed that the cultural materials and features of the site are encapsulated in lower West Range and Fort Hood alluvium and late Holocene colluvium (Figure 64). The profile of Backhoe Trench 1 revealed an upward-fining deposit of lower West Range alluvium capped by a 31-cm-thick deposit of Ford alluvium. The Ford alluvium is a very dark grayish brown clay loam imprinted with an A horizon. The underlying lower West Range deposit (31-235+ cm) fines upward from a moderately sorted, clast-supported basal gravel bed to a pale brown sandy clay loam capped with a dark gray clay loam. The deposit is imprinted with a Bwk-BC-C soil profile.

Backhoe Trench 3 was excavated in the broad shallow erosional chute or channel that cuts across the  $T_1$  terrace surface. The 283-cm-thick profile of Backhoe Trench 3 revealed a drape of Ford alluvium (0-49 cm) welded to a deposit of Fort Hood alluvium (49-283+ cm). This suggests that the erosional feature is at least 600 years old, having been cut and later filled with Ford alluvium. The Ford drape is a dark gray to dark grayish brown clay loam exhibiting an A-Bw soil profile; contact with the under-

lying Fort Hood alluvium is gradual due to pedogenic development. The Fort Hood deposits are yellowish brown, brownish yellow, to light yellowish brown clays, sandy clays, and clay loams. The profile is imprinted with a 2Bwkb-2BCb-2C soil.

The 238-cm-thick profile of Backhoe Trench 4 revealed lower West Range alluvium (0-157 cm) overlying Fort Hood alluvium (157-238+ cm). The lower West Range alluvium is a very dark gray clay loam and yellowish brown silty clay loam imprinted an A-Bw soil; contact with the underlying Fort Hood is gradual, masked by soil development. The Fort Hood deposit is a yellowish brown clay loam and is designated a Bwk horizon.

Backhoe Trench 5, placed at the toeslope of the valley wall, reveals a mix of late Holocene colluvium and anthropogenic deposits (0-116 cm) overlying Fort Hood alluvium (116-220+ cm). The mantle of colluvium and anthropogenic deposits consists of a black to grayish brown silty clay loam encasing a series of discrete cultural features of densely packed burned rocks. The location of Backhoe Trench 5 represents the fine-grained distal end of a colluvial wedge or fan that drapes the valley wall. The dark loamy colluvium is typical of late Holocene soil mantles shed from upland limestone substrates. These deposits are imprinted with an A-B soil profile. The underlying Fort Hood alluvium consists of a very pale brown gravelly clay loam. Soil genesis has welded this deposit, designated a Bw horizon, to the overlying deposits.

### Definition of Analysis Units

All of the cultural materials and features at 41CV1235 are buried in lower West Range and Fort Hood alluvium and late Holocene colluvium. Based on stratigraphic evidence, chronometric data, and diagnostic artifacts, two analysis units are defined.

#### Analysis Unit 1

Corresponding to the Late Archaic period, Analysis Unit 1 includes the thick anthropogenic midden and colluvial deposits from the surface to a maximum depth of 76 cm in Test Units 1 and 2, and to ca. 80 cm in Backhoe Trench 5. This unit also subsumes the entire West Range

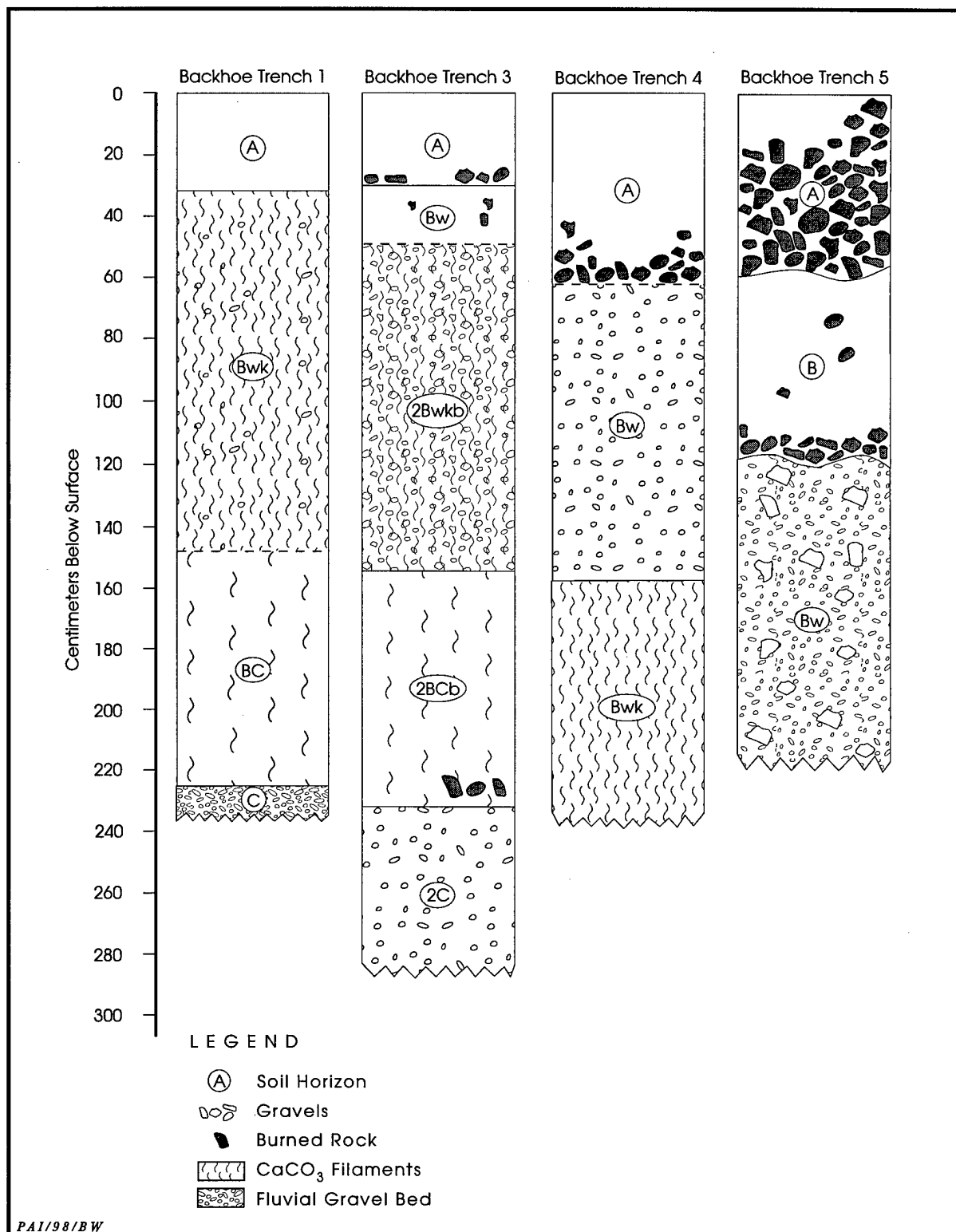


Figure 64. Profiles of Backhoe Trenches 1 and 3-5, 41CV1235.

alluvial deposit from 0–157 cm in Backhoe Trench 4, and includes Test Units 4 and 5 placed adjacent to this trench.

### Cultural Materials

A total of 1,319 artifacts (excluding burned rocks and unmodified bones) were recovered from feature and nonfeature contexts at 41CV1235 (Table 25). Most cultural materials associated with Analysis Unit 1 are from feature contexts: the burned rock midden (Feature 1) exposed in Test Units 1 and 2, the hearth (Feature 4) exposed in Test Unit 5, and the occupation zone (Feature 8) exposed in Test Unit 4. Artifacts associated with these features are discussed below (see Cultural Features).

Nonfeature cultural materials from Test Units 1 and 2 were confined to the upper 10 and 20 cm, respectively. A total of 14 burned rocks (1 kg) and 1 flake were found.

In Test Unit 4, 8 of 10 excavated levels included nonfeature fill. Each produced cultural materials, consisting of 29 burned rocks (2.5 kg), 47 flakes, 1 early- to middle-stage biface, and 1 vertebrate fragment. Approximately 50 percent of these materials occurred at 40–50 cm, directly above Feature 8 (see Cultural Features).

Except for one burned rock at 110–120 cm, all of the cultural materials in Test Unit 5 were contained in the upper 80 cm of deposit. Excluding the fill of Feature 4 from 44–68 cm, the cultural materials from 0–80 cm consisted of 4 burned rocks (0.50 kg), 57 flakes, 8 bone fragments (vertebrate and mammal), 1 side scraper, 1 miscellaneous uniface, and 1 Castroville point (10–20 cm). Thirty-eight of the 72 items (52.8 percent) were found at 40–44 cm, directly above Feature 4 (see Cultural Features).

### Cultural Features

Sloping from south to north, Feature 1, a burned rock midden, was encountered at 10 cm in Test Unit 1 and at 20 cm in Test Unit 2. Although the midden extended to a maximum depth of 70 cm in Test Unit 1, it was primarily confined to the northern half of the unit at 60–70 cm. Due to its slope, the feature was present only in the northwest quadrant of Test Unit 2 below 70 cm and extended to a maximum depth of 76 cm. Feature 1 fully extended across both units in Levels 2–6. Burned rocks were the domi-

nant material comprising this midden deposit; over 7,000 burned rocks, weighing over 1,000 kg, were associated with Feature 1 in Test Units 1 and 2 (Table 26).

In Test Unit 1, Feature 1 (10–70 cm) produced 3,311 burned rocks (523 kg), 382 flakes, 84 bones (see Appendix D), 1 quartzite hammerstone, and 10 lithic tools (see Table 26). The overwhelming majority of the faunal remains consisted of various sizes of mammals and vertebrates; however, bones ( $n = 3$ ) of Rodentia, Leporidae, and cf. *Odocoileus* sp. also were present. The stone tools included one Montell point from 20–30 cm and a Provisional Type I point from 60–70 cm. A flotation sample collected at 40–50 cm produced charred *Quercus* wood (see Appendix E). Four of the five additional processed flotation samples contained low frequencies of microfauna, microdebitage, and charred wood.

From 20–76 cm in Test Unit 2, Feature 1 yielded a total of 4,170 burned rocks (515.25 kg), 349 flakes, 13 lithic tools, 1 piece of ground hematite, and 54 bones (see Appendix D and Table 25). Only 4 bones could be identified to species (*Odocoileus* and *Sylvilagus*), with the remainder consisting of vertebrates and mammals (see Appendix D). The stone artifacts include an untyped dart point and a Pedernales point at 30–40 cm. Charcoal collected at the base of the midden (70–76 cm) yielded a radiocarbon age of  $3850 \pm 50$  B.P. (Beta-102132, see Appendix A). A flotation sample from 60–70 cm yielded charred *Quercus* and *Salix* woods (see Appendix E). Five additional processed flotation samples contained minimal amounts of microdebitage, charred wood, and microfauna (including a few burned fragments).

In addition to the cultural materials recovered from Test Units 1 and 2, a Pedernales point found at 42 cm in the west wall of Backhoe Trench 5 also is associated with Feature 1. It is a relatively rare find because the point is made of a coarse-grained nonlocal chert that is olive green in color (Munsell 5Y 4/3).

In both test units, about 63 percent of all the burned rocks occurred near the middle of the midden, from 30–50 cm. However, approximately 55 percent of the lithic artifacts and bones occurred from 60–70 cm, close to the base of the feature. The overwhelming majority of the rocks were fist-sized, angular, blocky pieces, with ca. 10 percent consisting of fossiliferous

Table 25. Summary of cultural materials from 41CV1235, Analysis Unit 1

Provenience	Dart Points	Bifaces	Unifaces	Core Tool	Edge-modified Flakes	Core	Unmodified Debitage	Ground Stone Tools	Modified Hematite	Unmodified Bones	Totals
<b>BACKHOE TRENCH 4</b>											
Unknown depth	2	4	1	0	0	0	0	0	0	8	15
<b>BACKHOE TRENCH 5</b>											
Feature 1 (42 cm)	1	0	0	0	0	0	0	0	0	0	1
<b>TEST UNIT 1</b>											
Level 1 (0-10 cm)	-	-	-	-	-	-	1	-	-	-	1
Feature 1 (10-20 cm)	-	-	-	-	-	-	22	-	-	3	25
Feature 1 (20-30 cm)	1	-	-	1	2	-	10	-	-	-	14
Feature 1 (30-40 cm)	-	-	-	-	-	-	30	1	-	1	32
Feature 1 (40-50 cm)	-	-	-	-	-	-	45	-	-	9	54
Feature 1 (50-60 cm)	-	-	-	-	1	-	61	-	-	17	79
Feature 1 (60-70 cm)	1	1	1	-	2	-	214	-	-	54	273
Subtotals	2	1	1	1	5	0	383	1	0	84	478
<b>TEST UNIT 2</b>											
Level 1 (0-10 cm)	-	-	-	-	-	-	-	-	-	-	0
Level 2 (10-20 cm)	-	-	-	-	-	-	-	-	-	-	0
Feature 1 (20-30 cm)	-	-	1	-	-	-	20	-	-	-	21
Feature 1 (30-40 cm)	2	1	-	-	-	-	36	-	-	1	40
Feature 1 (40-50 cm)	-	-	-	-	-	-	52	-	-	4	56
Feature 1 (50-60 cm)	-	1	-	-	-	-	41	-	-	8	50
Feature 1 (60-70 cm)	-	3	1	-	1	1	179	-	1	32	218
Feature 1 (70-76 cm)	-	-	1	-	1	-	21	-	-	9	32
Subtotals	2	5	3	0	2	1	349	0	1	54	417
<b>TEST UNIT 4</b>											
Level 1 (0-10 cm)	-	-	-	-	-	-	1	-	-	-	1
Level 2 (10-20 cm)	-	-	-	-	-	-	4	-	-	-	4
Level 3 (20-30 cm)	-	-	-	-	-	-	4	-	-	-	4
Level 4 (30-40 cm)	-	-	-	-	-	-	4	-	-	-	4
Level 5 (40-50 cm)	-	-	-	-	-	-	27	-	-	-	27
Level 8 (70-80 cm)	-	-	-	-	-	-	5	-	-	1	6
Level 9 (80-90 cm)	-	1	-	-	-	-	-	-	-	-	1
Level 10 (90-100 cm)	-	-	-	-	-	-	2	-	-	-	2
Feature 8 (50-70 cm)	2	1	-	-	1	-	126	2	-	82	214
Subtotals	2	2	0	0	1	0	173	2	0	83	263
<b>TEST UNIT 5</b>											
Level 1 (0-10 cm)	-	-	-	-	-	-	5	-	-	-	5
Level 2 (10-20 cm)	1	-	-	-	-	-	1	-	-	-	2
Level 3 (20-30 cm)	-	-	1	-	-	-	3	-	-	-	4
Level 4 (30-40 cm)	-	-	-	-	-	-	4	-	-	-	4
Level 5 (40-44 cm)	-	-	1	-	-	-	33	-	-	4	38
Level 7 (65-70 cm)	-	-	-	-	-	-	7	-	-	2	9
Level 8 (70-80 cm)	-	-	-	-	-	-	4	-	-	2	6
Feature 4 (44-68 cm)	2	1	-	-	1	-	309	1	-	81	395
Subtotals	3	1	2	0	1	0	366	1	0	89	463
<b>Totals</b>	<b>12</b>	<b>13</b>	<b>7</b>	<b>1</b>	<b>9</b>	<b>1</b>	<b>1,271</b>	<b>4</b>	<b>1</b>	<b>318</b>	<b>1,637</b>

**Table 26. Summary of burned rocks recovered from Feature 1 in Test Units 1 and 2, 41CV1235**

Provenience	Number	Weight (kg)
<b>TEST UNIT 1</b>		
10–20 cm	222	28.00
20–30 cm	721	84.00
30–40 cm	848	110.50
40–50 cm	877	122.00
50–60 cm	459	95.50
60–70 cm	184	83.00
Subtotals	3,311	523.00
<b>TEST UNIT 2</b>		
20–30 cm	377	31.75
30–40 cm	1,353	152.00
40–50 cm	1,134	133.50
50–60 cm	918	134.50
60–70 cm	348	58.00
70–76 cm	40	5.50
Subtotals	4,170	515.25
Totals	7,481	1,038.25

limestone. No internal features were apparent within the midden deposit in either test unit. Feature 1 was minimally disturbed by root activity, with no evidence of vandalism encountered in the test unit or trench excavations.

Feature 4 was encountered from 44–68 cm across Test Unit 5 (Figure 65). This hearth consisted of three layers of horizontally laid burned rocks ( $n = 222$ , 57 kg). Most of the rocks are angular, blocky, and thin tabular pieces; however, those at the base of the feature tended to be larger tabular rocks and thin slabs. Overall, the rocks ranged in size from 3x3x3 cm to 30x20x4 cm. A few rocks were cracked in place, and no evidence of disturbance was noted. One reworked Gower point, 1 dart point barb, 1 late-stage to finished biface, 1 edge-modified flake, 1 indeterminate ground stone fragment, 309 flakes, and 81 bones (see Appendix D) were recovered. Faunal remains ( $n = 9$ ) identified to species consisted of *Odocoileus* and *Antilocapra/Odocoileus*, including leg elements, teeth, and a portion of the mandible. Charcoal collected from 46–60 cm yielded a radiocarbon age of  $3110 \pm 50$  B.P. (Beta-102134, see Appendix A). A flotation sample collected at the same depth yielded charred *Quercus* and indeterminate woods, in addition to indeterminate thin nutshell fragments (see Appendix E). Another processed flotation sample from Feature 4 contained low frequencies of

microdebitage, microfauna, and charred wood. Burned rocks were exposed in the south wall of Backhoe Trench 5 beyond the east and west walls of Test Unit 5 and in each wall of the test unit. However, evidence of the hearth is not apparent in the trench wall opposite Test Unit 5. Based on these exposures, this hearth is estimated to have a diameter of 146 cm.

At 50–70 cm, Feature 8 extended across Test Unit 4. The feature matrix yielded a total of 116 burned rocks (35 kg), 82 bones (see Appendix D), 126 flakes, 2 dart point barbs, a late-stage to finished biface, 1 edge-modified flake, a limestone metate fragment, and 1 mano/hammerstone (chert cobble). Five bones represent the lower leg elements of *Antilocapra/Odocoileus*. Most of the burned rocks were flat, tabular pieces ranging from 3–15 cm in length, 3–15 cm in width, and 1–3 cm in thickness. The remainder were fragmented, angular pieces. The burned rocks exhibited no patterning, and Feature 8 is interpreted as an occupation zone containing scattered burned rocks. The feature was minimally disturbed by root intrusion. Burned rocks visible in all three test unit walls indicate that the feature continues an unknown distance in these directions. A processed flotation sample collected at 55–60 cm contained sparse amounts of microdebitage and microfauna.

### Discussion

Utilization of the area during the Late Archaic period is indicated by the calibrated charcoal radiocarbon dates of 2400 (2300) 2205 B.C. and 1420 (1395) 1305 B.C. from Features 1 and 4, respectively (see Appendix A). The older date, along with the recovery of a Provisional Type I point from the base of Feature 1 (a buried midden situated in a colluvial toeslope), correlate to the transition from the Middle to Late Archaic periods and suggest that initial occupations occurred at this time. One Montell and two Pedernales points recovered from the upper portion of Feature 1 indicate that the midden accreted primarily during the Late Archaic period.

Features 4 and 8 were encountered in the test units placed on the terrace north of Feature 1. Both features and all the cultural materials were contained within the A horizon, particularly from 30–70 cm. A reworked Gower point was recovered from Feature 4; however, the calibrated date



**Figure 65.** View south of Feature 4 in Test Unit 5, 41CV1235.

of 1420–1305 B.C. suggests that the artifact was reused by later peoples. In addition, one Castroville point (10–20 cm) and one Pedernales point (from trench backdirt) were recovered. Although chronometric data are lacking for Feature 8, stratigraphically it appears to correlate with Feature 4. Based on the foregoing, the 70-cm-thick cultural deposit comprising the A horizon suggests intensive and repeated occupations during the Late Archaic period.

The test results demonstrate the presence of an intact, subsurface midden deposit (Feature 1) located on the toeslope at the southwest site margin. Although this feature occurs between 10 and 138 cm, the differences in elevation are related to the varying thickness of the overlying sediments sealing the midden deposit. Nowhere in the exposure afforded by Backhoe Trench 5 is the midden greater than 70 cm thick.

Based on exposures of burned rocks and cultural materials in road cuts and potholes on the T<sub>1</sub> surface, the minimum estimated dimensions of Feature 1 are 140x50 m.

Stratigraphic and temporal evidence indicate that the hearth and occupation zone buried in the terrace are contemporaneous with the upper portion of the toeslope midden deposit. The cultural assemblages associated with these features are diverse and represent a range of activities, such as stages of lithic reduction (based on the presence of hammerstones, core/core tools, and several expedient and formal tools). The bones clearly represent hunting, particularly of small and medium-sized game such as mouse-sized rodent, cottontail rabbit, and pronghorn/deer. The burned and spirally fractured bones from feature contexts suggest these modifications reflect human activity. Ground stone tools and preserved charred nutshell fragments (probably pecan) are indicative of food gathering and processing. Willow and oak

woods from the midden and hearth represent fuel resources. Two rare artifacts—a piece of ground hematite and a Pedernales point of nonlocal chert—also were recovered from Feature 1. The former, which is a naturally occurring mineral on Fort Hood, was probably used to obtain red paint for ornamental purposes. The latter clearly represents an imported material.

### **Analysis Unit 2**

Analysis Unit 2 correlates to the Middle Archaic period. This unit encompasses the late Holocene colluvium and underlying Fort Hood alluvium from 70–140 cm in Test Units 1 and 2 from 80 cm to a maximum depth of 220 cm in Backhoe Trench 5. The transition between Analysis Units 1 and 2 is not abrupt, and the two partially overlap at the base of Feature 1

from 70–80 cm (see Analysis Unit 1, Discussion). Also included is the Fort Hood alluvium exposed from 0–260 cm in Backhoe Trench 2 and from 125–200 cm in Test Unit 3.

### Cultural Materials

Since Test Units 1 and 2 are contiguous, their results are presented collectively. Similar types of cultural materials were found from 70–140 cm in both units. These consist of a total of 601 flakes, 354 burned rocks (34.25 kg), 211 bones (see Appendix D), 6 unmodified mussel shells, 2 chert hammerstone fragments, and 38 lithic tools

(Table 27). Most of these cultural materials are associated with Features 5, 6, and 7 (see Cultural Features). Faunal elements identified to species include *Odocoileus* and *Antilocapra/Odocoileus* lower leg bones, but the majority (ca. 96 percent) consist of vertebrates and medium-sized to large mammals. Diagnostic lithic artifacts include two Travis and six Provisional Type I points at 70–95 cm in Test Unit 2, and one Dawson point in Test Unit 1 at 105 cm.

From 125–200 cm in Test Unit 3, only Levels 15 and 16 (140–160 cm) yielded cultural materials. They produced a total of 20 burned rock fragments (0.5 kg) that are probably

**Table 27. Summary of cultural materials from 41CV1235, Analysis Unit 2**

Provenience	Dart Points	Bifaces	Unifaces	Core Tools	Multifunctional Tools	Edge-modified Flakes	Cores	Unmodified Debitage	Hammerstones	Unmodified Bones	Unmodified Shells	Totals
<b>BACKHOE TRENCH 5</b>												
101 cm	1	0	0	0	0	0	0	0	0	0	0	1
<b>TEST UNIT 1</b>												
Level 8 (70–80 cm)	–	–	–	–	–	1	–	82	–	46	–	129
Level 9 (80–90 cm)	–	–	–	–	–	1	–	27	–	10	–	38
Level 10 (90–100 cm)	–	1	1	–	–	–	1	40	–	3	–	47
Level 11 (100–110 cm)	1	1	–	–	–	3	–	22	–	8	–	35
Level 12 (110–120 cm)	–	–	–	–	–	–	–	9	–	–	–	9
Level 13 (120–130 cm)	–	–	–	–	–	–	–	–	–	–	–	0
Level 14 (130–140 cm)	–	–	–	–	–	–	–	–	–	–	–	0
Subtotals	1	2	1	0	0	5	1	181	0	67	0	258
<b>TEST UNIT 2</b>												
Level 8 (70–80 cm)	4	1	1	–	–	2	–	168	–	48	–	224
Level 9 (80–90 cm)	3	1	–	–	–	2	–	120	–	50	3	179
Level 10 (90–100 cm)	1	–	4	–	–	2	1	72	2	23	1	106
Level 11 (100–110 cm)	–	1	–	–	–	1	–	33	–	10	–	45
Level 12 (110–120 cm)	–	1	–	–	1	–	–	23	–	13	2	40
Level 13 (120–130 cm)	–	–	–	1	–	1	–	4	–	–	–	6
Level 14 (130–140 cm)	–	–	–	–	–	–	–	–	–	–	–	0
Subtotal	8	4	5	1	1	8	1	420	2	144	6	600
<b>TEST UNITS 1 AND 2</b>												
Feature 5 (75–95 cm)	–	2	2	1	2	3	2	86	–	25	1	124
Feature 6 (102–124 cm)	–	–	–	–	–	–	–	1	–	–	–	1
Feature 7 (110–133 cm)	–	–	–	–	–	–	–	4	–	–	–	4
Subtotals	0	2	2	1	2	3	2	91	0	25	1	129
<b>TEST UNIT 3</b>												
Feature 3 (165–179 cm)	1	0	0	0	0	0	0	0	0	0	0	1
Totals	11	8	8	2	3	16	4	692	2	236	7	988



associated with Feature 3 (see Cultural Features).

### Cultural Features

Feature 3 (a burned rock concentration) was encountered at 165–179 cm in Test Unit 3. The feature consisted of one horizontally laid layer of 14 burned rocks (19.5 kg). Some of the rocks abut one another, but few exhibit imbrication. Although the maximum excavated dimensions are 97 cm north-south by 65 cm east-west, this feature encompassed two “clusters” of rocks along the east edge of the test unit and four burned rocks near the west wall (Figure 66). One cluster was 48 cm north-south by 29 cm east-west and situated primarily in the northeast quadrant of the unit. Here, three of six burned pieces of nonfossiliferous limestone were cracked in place. The second cluster, situated 12 cm south of the first, consisted of four burned pieces of fossiliferous limestone in an area measuring 27 cm north-south by 24 cm east-west. Remnants of oxidized sediment below and around this cluster of rocks suggest *in situ* burning. The four scattered burned rocks near the west wall were nonfossiliferous pieces. Most of the rocks, both scattered and clustered, were thin, tabular pieces averaging 10x8x6 cm; the remainder were slabs measuring up to 25x24x8 cm. No evidence of disturbance was apparent. Associated charcoal collected at 171 cm yielded a radiocarbon age of

4600 ± 50 B.P. (Beta-102131, see Appendix A). A flotation sample collected at 171–176 cm yielded no charred macrobotanical remains (see Appendix E). One Pedernales point was recovered from the feature fill. A few burned rocks were visible in the west wall of Backhoe Trench 2 just beyond the northern limit of the test unit, but no rocks were exposed in the east wall opposite Test Unit 3. Based on these exposures and the excavation results, the feature’s estimated dimensions are 105 cm north-south and 140 cm east-west.

Encountered at 75–95 cm in Test Units 1 and 2, Feature 5 consists of two to three layers of jumbled burned rocks ( $n = 409$ , 166.5 kg) and is interpreted as a 20-cm-thick occupation zone. Feature 5 occurs directly below Feature 1 (midden), with the two features separated by 4–5 cm of relatively rock-free matrix. Although its maximum excavated dimensions are 180 cm north-south by 100 cm east-west, more rocks were present upslope in Test Unit 1, and they were less dense downslope in Test Unit 2. The thickest portion of the feature occurred at the southern end of Test Unit 1. All of the burned rocks were angular pieces of nonfossiliferous limestone, with none greater than 15 cm in size. Minimally disturbed by root activity, the feature slopes gradually from south to north and west to east. Feature matrix contained 86 flakes, 25 vertebrate and mammal bone fragments (see Ap-

pendix D), 12 lithic tools, and 1 unmodified mussel shell. Charcoal collected from 79–90 cm yielded a radiocarbon age of 4120 ± 50 B.P. (Beta-102133, see Appendix A). Although not submitted for macrobotanical analysis, a processed flotation sample (79–90 cm) contained minimal amounts of microdebitage, microfauna, and charred wood. Burned rocks were visible in the south and west walls of Test Unit 1, and in the west wall of Backhoe Trench 5 for approximately 2.2 m beyond the southern edge of Test Unit 1. Burned rocks were not present in the east wall of the trench opposite the test units. These exposures indicate that Feature 5 is rather large, measuring at least 320 cm

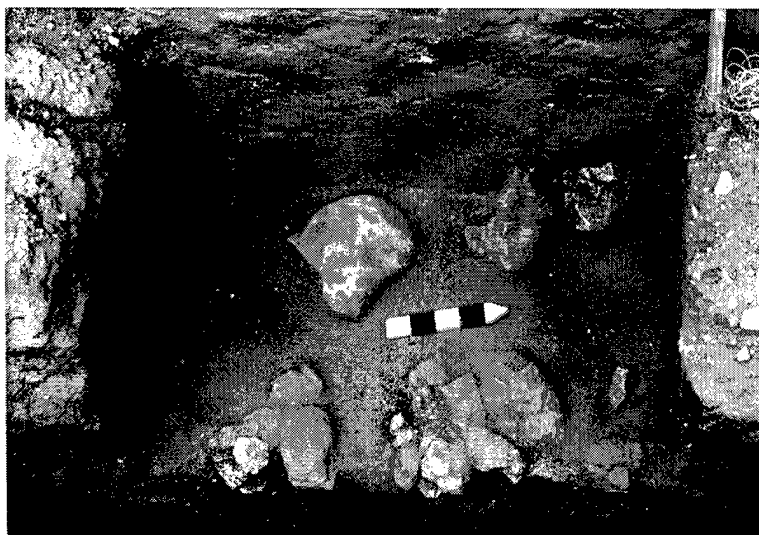


Figure 66. View west of Feature 3 in Test Unit 3, 41CV1235.

north-south by 170 cm east-west.

Features 6 and 7 were encountered at 102–124 cm and 110–133 cm, respectively. Both were present in Test Units 1 and 2, with Feature 6 representing a burned rock concentration on a living surface that is directly associated with Feature 7, a basin-shaped hearth.

Feature 6 consists of two to three layers of 98 burned rocks (60.5 kg). The majority were horizontally laid, with some slightly angled. Approximately 60 percent were tabular pieces (averaging 10x7x3 cm); 30 percent were angular fragments. The remainder were slabs (many of which were broken) that measured up to 20x10x3 cm. All of the rocks were nonfossiliferous limestone, with no evidence of disturbance apparent. The feature fill produced one flake. A flotation sample collected at 102–112 cm yielded no charred macrobotanical remains (see Appendix E). The maximum excavated dimensions of Feature 6 are 200 cm north-south by 100 cm east-west. Burned rocks were visible in the west wall of Backhoe Trench 5, about 100 cm south and 120 cm north of the boundaries of Test Units 1 and 2, respectively. Burned rocks also were exposed at the same elevation in the trench's east wall, opposite the test units. Based on these exposures, Feature 6 covers a minimum of 420 cm north-south and 200 cm east-west. The feature is interpreted as a dump of hearth debris associated with a more extensive living surface.

Feature 7, an intact hearth, was apparent once the burned rocks comprising Feature 6 were removed. This 23-cm-thick hearth was present in the eastern two-thirds of Test Units 1 and 2, and its western edge was clearly delimited in the test excavations (Figure 67). Its maximum excavated dimensions are 200 cm north-south by 75 cm east-west. The perimeter of the hearth consisted of one to two rock layers, but the innermost (center) portion was two to three rock layers thick. Based on exposures afforded by Backhoe Trench 5, the feature's estimated dimensions are 210 cm north-south by 150 cm east-west. A distinct basin was evident, with at least half of the

rocks angled and sloping toward the center of the hearth located along the eastern walls of the test units. Three vertical rocks were also present and do not appear to represent disturbance.

The excavated portion of Feature 7 consisted of 147 burned rocks (136.25 kg), of which 1 was fossiliferous limestone. Approximately 70 percent of the rocks were large tabular pieces (typically 10x8x4 cm); ca. 15 percent were slabs (up to 20x20x6 cm), and the remainder were fist sized and angular. Although one medium-sized root was located at the center of the hearth, the feature's morphology and the presence of rocks cracked in situ suggest excellent contextual integrity. The feature fill produced four pieces of debitage. A charcoal sample collected at 110–125 cm yielded a radiocarbon age of  $4490 \pm 50$  B.P. (Beta-102135, see Appendix A). Analysis of a flotation sample collected at 110–125 cm yielded no charred macrobotanical remains (see Appendix E), and no microfauna, microdebitage, or charred remains were observed in a second processed flotation sample from 115–128 cm.

### Discussion

Multiple occupations during the Middle Archaic period are indicated by the calibrated radiocarbon charcoal dates of 3370–3340 B.C., 3335–3070 B.C., and 2865–2585 B.C. (see Appendix A). The oldest date (3370–3340 B.C.) is

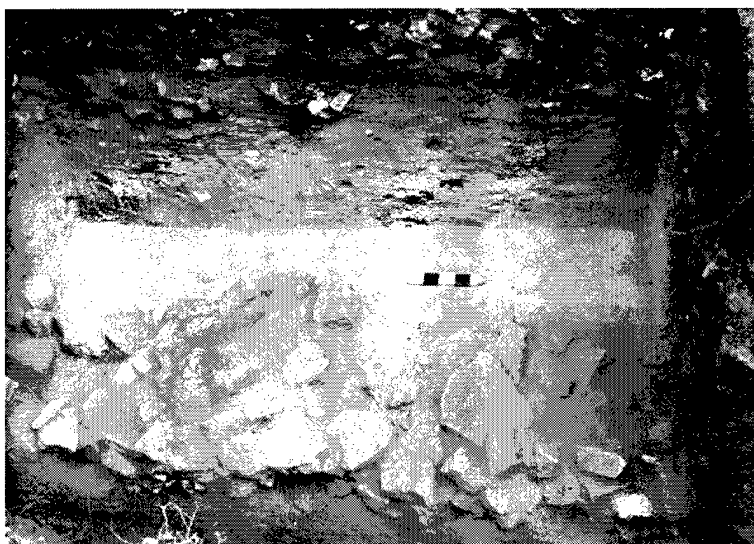


Figure 67. View west of Feature 7 in Test Units 1 and 2, 41CV1235.

associated with Feature 3; however, this date is seemingly contradicted by a Pedernales point in direct association with the feature. No evidence of bioturbation was observed, and the feature and its surrounding matrix appeared intact. Four possible explanations are offered to account for this phenomenon. (1) The date and point are contemporaneous, indicating that Pedernales points were made much earlier than previously thought (i.e., in the Middle Archaic). (2) The radiocarbon date is erroneous and is much older than the true age of the actual use of Feature 3. (3) The radiocarbon age is accurate but represents only one Middle Archaic use-episode, and the feature was used again in Late Archaic times. (4) The Pedernales point is intrusive from a later occupation. None of these explanations is entirely satisfactory, although the fourth is perhaps the most likely.

The younger dates of 2865–2585 B.C. for Feature 5 and 3335–3070 B.C. for Feature 7 are spatially discrete and in correct stratigraphic sequence. Travis and Dawson points associated with these dated features correspond to the Middle Archaic period. Six additional dart points, herein identified as Provisional Type I, were also recovered in association with these features and are considered contemporaneous.

Feature 5, an occupation zone, produced the greatest frequency of cultural materials. The assemblage contains expedient and formal tools and cores/core tools indicating early to late stages of lithic reduction. The presence of vertebrate and invertebrate remains demonstrates hunting and exploitation of aquatic resources. Sparse cultural materials were removed from, or associated with, Features 3, 6, and 7. Only minimal charred macrobotanical remains were recovered from features, but this may be the result of limited sampling.

### **Summary and Conclusions**

The test results demonstrate that 41CV1235 was intensively occupied over a long period of time. The multiple cultural components correlate to the Middle Archaic and Late Archaic periods and span 1,650 years. Figure 68 summarizes these occupations by the stratigraphic distributions of features, calibrated radiocarbon dates, and diagnostic projectile points. In Analysis Units 1 and 2, the archeological remains include intact features, rich artifact assemblages,

and the preservation of perishable organic materials. An array of activities consisting of various stages of lithic reduction; hunting, gathering and processing of foodstuffs; and manufacture of ornaments is represented. Game animals included deer, pronghorn/deer, and rabbits; however, the majority of the faunal remains were unidentified vertebrates ( $n = 367$ , 66.2 percent). Approximately 28 percent ( $n = 153$ ) of all the bones ( $n = 554$ ) were spirally fractured and 20 percent ( $n = 110$ ) exhibited burning (see Appendix D); these alterations are probably related to human activity. Charred nutshell fragments and unmodified mussel shells indicate utilization of the surrounding flora and aquatic resources. In addition, modified hematite and a Pedernales point manufactured of nonlocal chert represent unique artifacts. Due to the presence of intact features and associated archeological remains in stratigraphic sequence, site 41CV1235 is considered significant and recommended as eligible for inclusion in the NRHP.

### **41CV1250**

#### **Site Setting**

Site 41CV1250 is situated on a series of strath and alluvial terraces on the north side of House Creek. The site is bounded on the south and east by House Creek (Figure 69). A deeply incised tributary bisects the site and joins with House Creek along the southern site boundary. The toeslope of the valley wall and an unnamed tributary of House Creek define the northern and western site boundaries, respectively. Although a dense juniper and hardwood forest is present at the eastern site margin and along the bank of House Creek, the majority of the site is open grassland. With the exception of the areas covered with trees, the entire site has been disturbed by tank traffic and erosion. Site elevation is 240–250 m above mean sea level.

#### **Previous Work**

Dureka and Kooren (Texas A&M University) recorded the site on 19 May 1986 as a burned rock and lithic scatter. Site dimensions were defined as 1,050 m east-west by 400 m north-south. A low density scatter of flakes, cores, burned rocks, and mussel shells was observed. One Ensor, an untyped dart point, an end scraper,

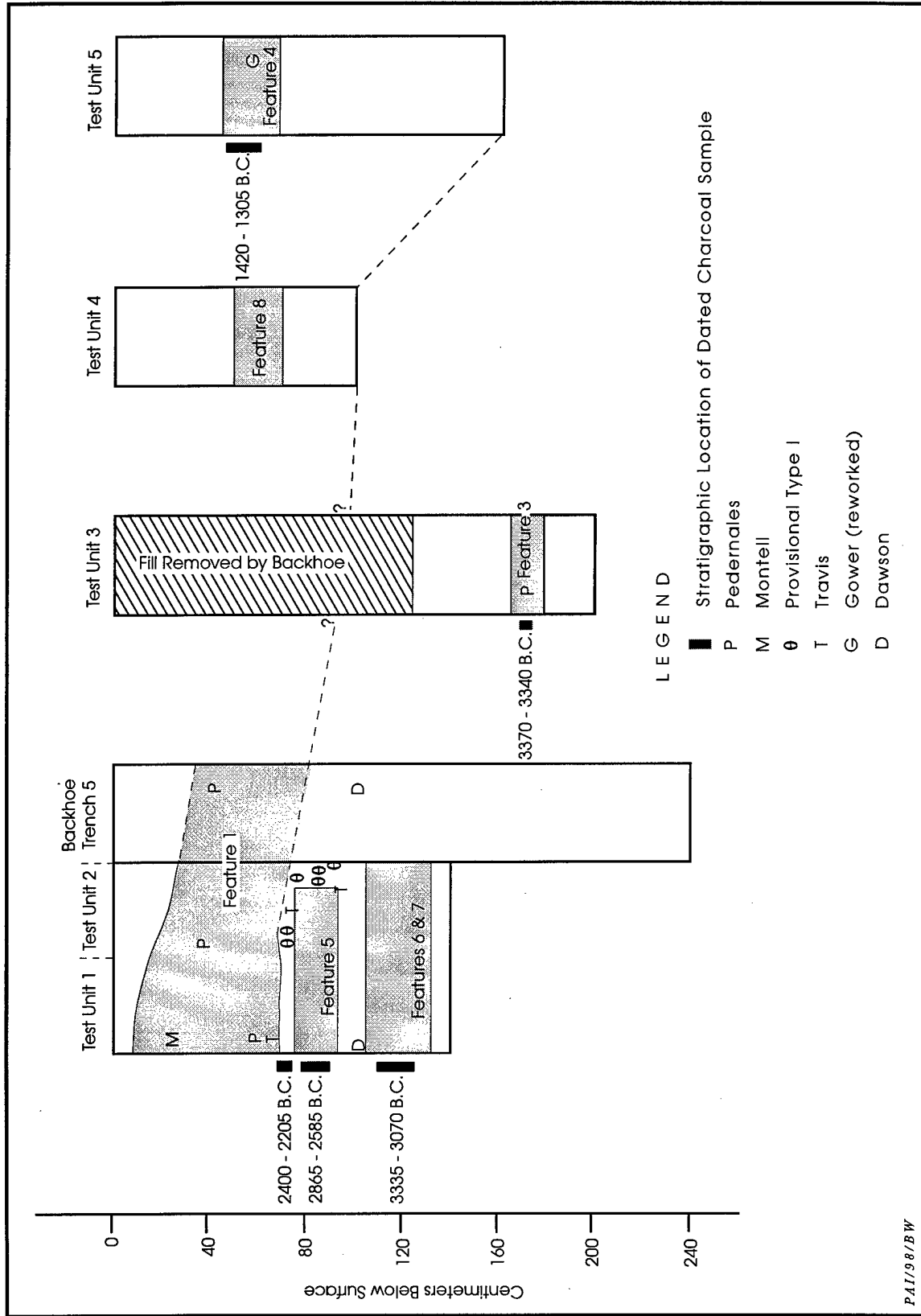


Figure 68. Schematic comparison of feature stratigraphy and site chronology for Analysis Units 1 and 2, 41CV1235.

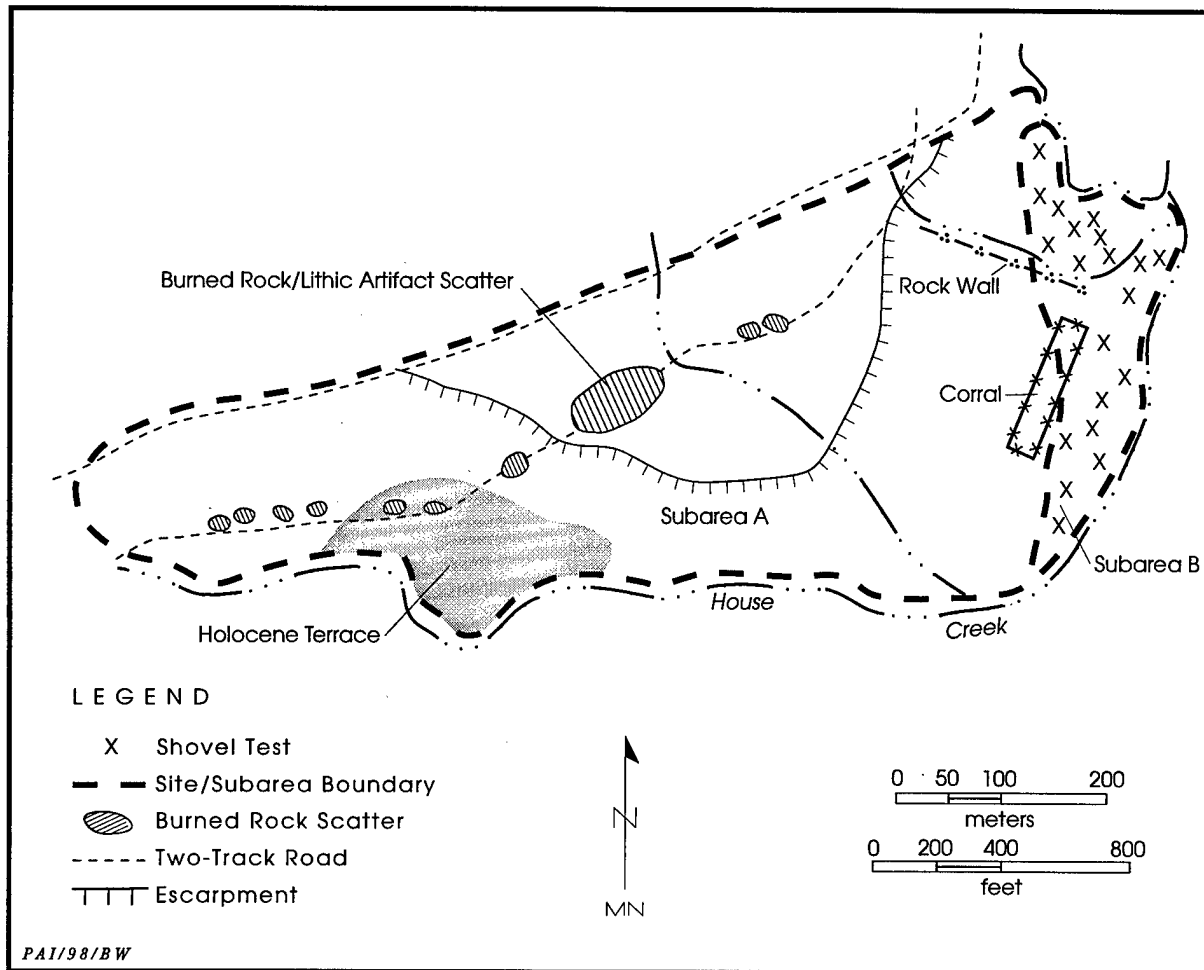


Figure 69. Site map, 41CV1250 (modified from Trierweiler, ed. 1994:A1392).

a core, and a piece of limonite were collected. The site was estimated to be 65 percent disturbed by erosion, vehicular traffic, and cattle grazing. The site was later designated as a lithic resource procurement area (LRPA) for management purposes.

The site was revisited on 30 November 1992 by Kleinbach and Abbott (Mariah Associates) for archeological and geomorphological reconnaissance and assessment. Site size was defined as 1,000 m east-west by 450 m north-south. Based on differing geomorphic surfaces, the site was divided into Subareas A and B. However, information regarding the definitions of Subareas A and B in the 1992 site map contradicts the information presented in records and the 1994 published site description and map. Notations of this contradictory information are presented

for clarification in the following discussion.

Subarea A encompassed the majority of the site and consisted of two distinct Pleistocene surfaces,  $T_{2a}$  and  $T_{2b}$ . These surfaces were situated approximately 10–14 m and 8–10 m above the channel, respectively. Subarea A also included a thin wedge-shaped drape of probable Holocene alluvium ( $T_1$ ) and a modern gravel bar ( $T_0$ ) along the southern edge of the site. The upper Pleistocene surface ( $T_{2a}$ ) is essentially a strath terrace with a very thin mantle of mixed alluvial and colluvial sediments. These sediments exhibited a thin (generally less than 15 cm) sandy loam Ap horizon and were underlain by an indurated calcrete developed on the limestone strath surface (2K-2R profile). This upper surface graded into the lower Pleistocene terrace ( $T_{2b}$ ) on the east, and the two surfaces

were separated by a distinct, rounded scarp approximately 1 m high. The lower Pleistocene surface was interpreted as rubified Jackson alluvium (Nordt 1992) with an Ap-Bw-Bk-Cox profile. The fill underlying this surface is complex, with interbedded, fine-grained, and gravelly deposits indicating deposition by a braided fluvial system. The surficial deposits were observed to be completely disturbed by agricultural activity.

A moderate density of debitage, a low density of burned rocks, several bifaces, chert nodules, and a 10x3-m dispersed burned rock concentration were observed in Subarea A. The burned rock concentration, designated Feature 3, was eroded into a tank trail and comprised of burned angular limestone and a few flakes. One Ensor dart point was collected from this area during the reconnaissance. Because of the extensive agricultural disturbances, no testing was recommended for Subarea A.

Subarea B encompasses the lower terraces ( $T_1$ ) on the eastern edge of the site along House Creek. Two alluvial surfaces,  $T_{1a}$  and  $T_{1b}$ , were present and are bisected by two unnamed tributaries. The majority of Subarea B is associated with the higher ( $T_{1a}$ ) surface, which lies approximately 6–8 m above House Creek, merges imperceptibly with the gentle sloping  $T_{2b}$  surface to the north and west, and exhibits an Ap-Bwk-R profile. A second inset alluvial fill is associated primarily with the tributaries and forms the  $T_{1b}$  surface, approximately 4–5 m above the streams. The majority of the  $T_{1a}$  surface is underlain by brown loams and gravelly loams that probably represent the Fort Hood fill (Nordt 1992). A dark grayish brown alluvial unit, thought to represent West Range fill (Nordt 1992), is inset into and partially overrides the older fill. Both of these units consist primarily of fine-grained deposits with inset lenses of gravel. Soil profiles are characterized by a granular to blocky A horizon underlain by a thick, blocky Bwk horizon with abundant carbonate filaments. A third alluvial unit, characterized by a dark grayish brown sediment exhibiting an A-C profile, represents Ford deposits lapped onto the leading edge of the terrace surface. Approximately half of the Subarea B surface was observed to be disturbed by plowing and vehicular traffic, but the presence of a dense hardwood forest near the tributaries suggested to the investigators that the deposits in the northern portion of Subarea B

were undisturbed.

A few flakes and burned rocks were observed on the surface of Subarea B. A 20-m-long cutbank exposure on the west side of the easternmost unnamed tributary contained several burned rocks, a few flakes, and mussel shells at 50–70 cm, some burned rocks at 120 cm, and a hearth (Feature 1) at about 180 cm. The hearth remnant was described as eight tightly clustered burned rocks in a 40-cm-area with charcoal flecking between and below the rocks.

The site was revisited on 10 December 1993, and 20 shovel tests were excavated to a maximum depth of 40 cm in Subarea B. Of these, only one (5 percent) yielded positive results. This shovel test was excavated between the two tributaries of House Creek near the east edge of the site. A buried burned rock feature (Feature 2) was encountered at 10 cm, with excavation continuing to 35 cm, at which point the density of the burned rocks prohibited further excavation. Three flakes were recovered from the shovel test, and mussel shell fragments were observed at 10–20 cm.

Abbott and Kleinbach returned on 1 April 1993 to evaluate the site's potential for addressing questions of lithic resource procurement and reduction. Chert and impact zones were identified and mapped with the appropriate forms, and chert samples were collected. Since the site contained chert resources and was not completely damaged by military activity, a crew returned on 2 April 1993 and made over 40 observations at 30-m intervals along eight transects.

Based on test results, Subarea A lacked integrity and had a limited research potential; no further work was recommended. Subarea B, which had potential for containing isolable occupations of unknown significance, was judged to be potentially eligible for listing in the NRHP. A minimum formal testing effort of two to four trenches and four to six 1x1-m test units was recommended to determine the NRHP eligibility of Subarea B (Trierweiler, ed. 1994:A1391–A1395).

### Work Performed

Formal testing of Subarea B of site 41CV1250 was completed by Prewitt and Associates on 6 September 1996. Although most of the testing was concentrated in Subarea B, some testing was done on the  $T_1$  and  $T_0$  terraces in

Subarea A. Two backhoe trenches (Backhoe Trenches 4 and 5) were excavated in Subarea A (Figure 70), and three backhoe trenches (Backhoe Trenches 1–3) and three test units (Test Units 1–3) were excavated in Subarea B (Figure 71). Approximately 4.7 m<sup>3</sup> was manually dug.

Backhoe Trench 1 (13.0x0.8x2.4 m, oriented to 283°) was placed perpendicular to House Creek in the central portion of Subarea B. No cultural materials were observed in this trench. Backhoe Trench 2 (10.0x1.5x2.7 m, oriented to 323°) was placed north of Backhoe Trench 1 and

perpendicular to House Creek above a section of cutbank from which cultural materials were eroding at ca. 80 cm. Only a few small burned rocks and flakes were found at the end of the trench nearest the cutbank, at about the same depth as the materials eroding from the cutbank. Backhoe Trench 3 (15.0x1.5x2.7 m, oriented to 252°) was placed between the two tributaries at the northern margin of Subarea B, 10 m west of the cutbank in which the previous investigators had observed Feature 1. A hearth (Feature 5) was noticed and avoided during trenching. The

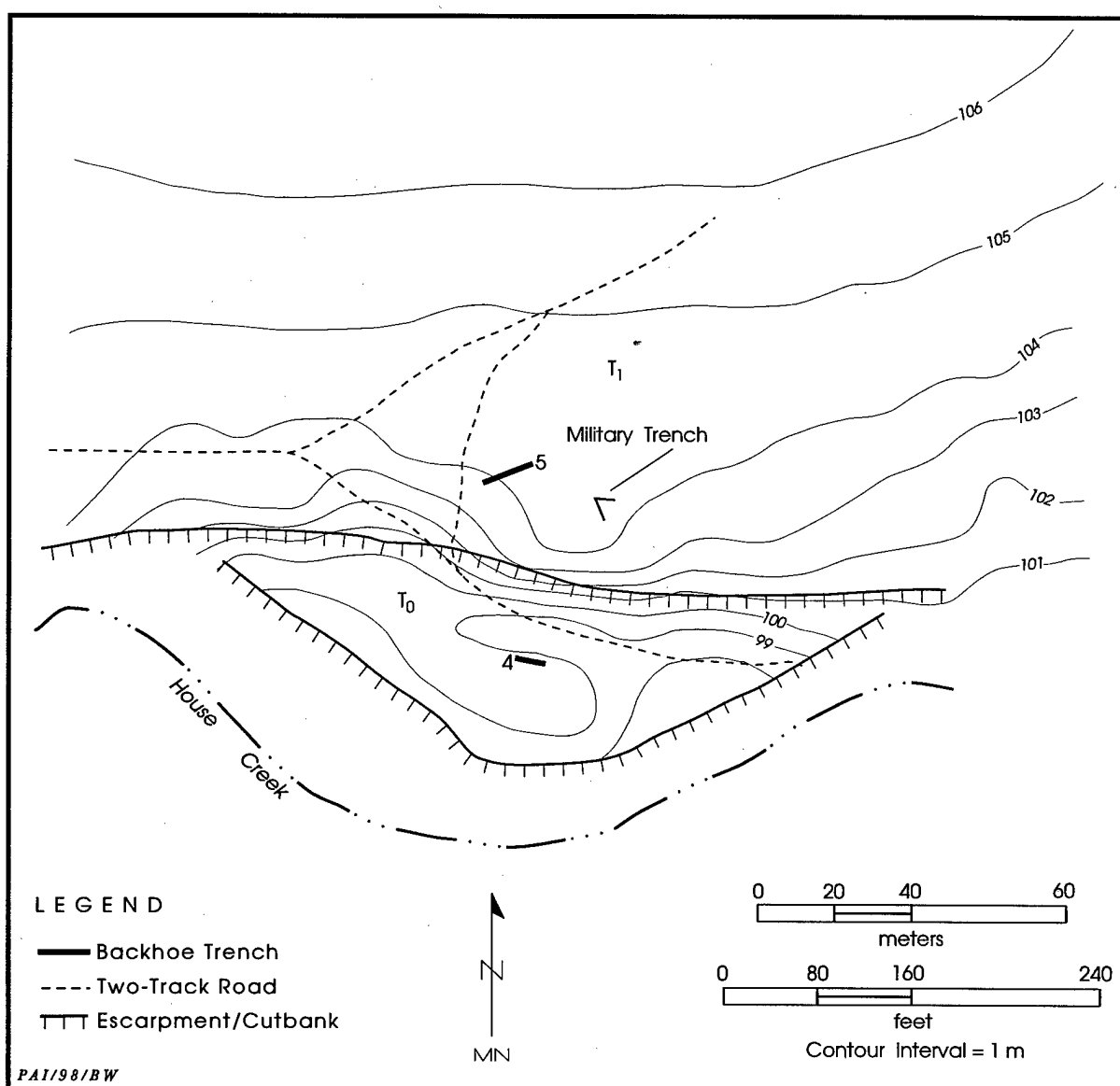
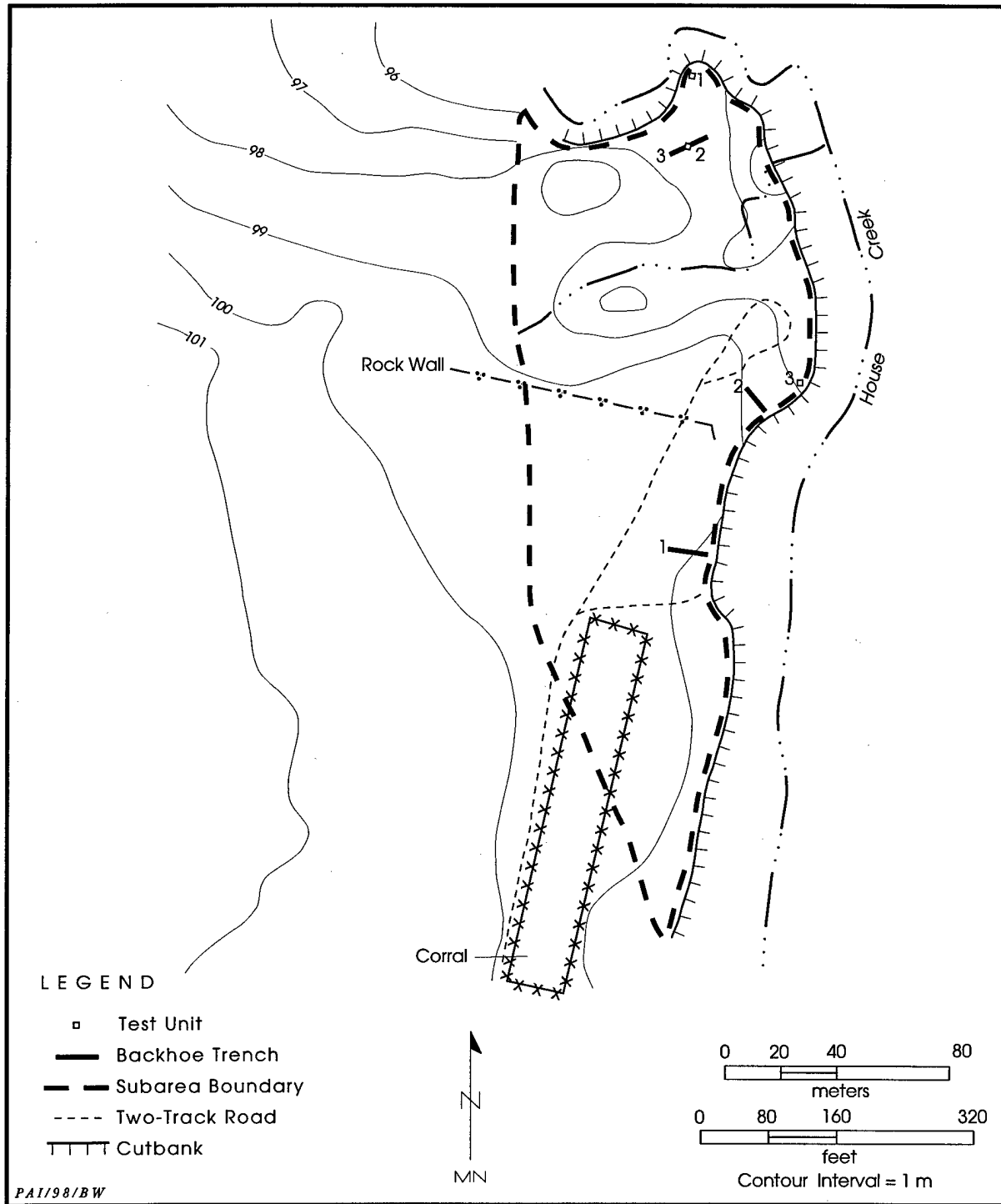


Figure 70. Map of tested portion of Subarea A, 41CV1250.



**Figure 71.** Map of Subarea B, 41CV1250.

trench was widened and the matrix overlying the hearth was mechanically removed to facilitate excavation.

In Subarea A at the other end of this extensive site, Backhoe Trench 4 (5.0x0.8x1.0 m) was placed parallel to House Creek on the T<sub>0</sub> terrace.



Backhoe Trench 5 (10.0x0.8x2.3 m) was oriented to 245° and placed at the edge of the T<sub>1a</sub> terrace. No cultural materials were observed in either of these trenches. The profiles of Backhoe Trenches 2–5 were described and soil geomorphology was assessed.

Test Unit 1 was placed along the cutbank edge in an area where previous investigators observed cultural materials at 50–70 and 120 cm and a hearth (Feature 1) at ca. 180 cm. It was excavated as a 1.5x1.0-m unit from 0–80 cm, then as a 1x1-m unit to dense gravels at 160 cm. Test Unit 2 (1.3x1.0-m unit) was placed inside Backhoe Trench 3 in the area cleared above Feature 5; it was excavated from 105–160 cm. Test Unit 3 (1x1-m unit) was placed 10 m north of Backhoe Trench 2 and near the edge of the House Creek cutbank in the area where cultural materials were observed at 80 cm. Test Units 1 and 3 were oriented to magnetic north, and Test Unit 2 was oriented to 345°.

### **Site Extent and Depth**

Although the site extends along a vast expanse of the north side of House Creek, only Subarea B was intensively tested during this study. Subarea B encompasses an area approximately 310 m north-south by 100 m east-west. From north to south across Subarea B, cultural artifacts were found at 10–30, 50–90, and 100–150 cm in Test Unit 1, in almost every level of Test Unit 2, and from 60–100 cm of Test Unit 3.

### **Sediments and Stratigraphy**

Backhoe trenches were excavated on the T<sub>1a</sub>, T<sub>1b</sub>, and T<sub>0</sub> terraces at the site. Backhoe Trench 5 is on the T<sub>1a</sub> surface and is underlain by Fort Hood and Georgetown alluvium. The Fort Hood alluvium (0–86 cm) is a very dark grayish brown to yellowish brown clay loam exhibiting a blocky A-Bw soil profile. The contact with the underlying Georgetown alluvium (86–211+ cm) is abrupt and wavy. The Georgetown alluvium consists of interbedded fine-grained and gravelly deposits imprinted with a 2Bwb-2C-3Bwb soil profile. The upper Georgetown deposits are a very pale brown silty clay (86–118 cm) overlying a clast-supported gravel bed (118–131 cm). The lower deposits (131–211+ cm) consist of a very pale brown sandy clay loam with inset thin gravel beds.

The sediments and stratigraphy of the T<sub>1b</sub>

terrace were observed in Backhoe Trenches 2 and 3 (Figure 72). The profile of Backhoe Trench 2 consists of Ford alluvium (0–90 cm) overlying lower West Range alluvium (90–236+ cm). The dark loamy Ford deposits are imprinted with a blocky A-Bw soil profile. The underlying lower West Range deposits are capped by a 20-cm-thick, clast-supported gravel bed resting on a truncated soil. The soil (2Bkb-2Bwb) is formed in a light yellowish brown sandy clay and yellowish brown clay loam. Backhoe Trench 3, which is near the confluence of an unnamed tributary and House Creek, consists of Ford (0–80 cm) and upper West Range alluvium (80–256+ cm). Although upper West Range deposits are rare along House Creek, it is believed that the confluence of the two drainages has facilitated slackwater deposition of fine-grained alluvium during flood events over the last 2,000 to 2,500 years. The dark clayey to loamy Ford deposits are imprinted with an A-Bw soil profile. The upward-fining upper West Range deposits exhibit a 2Abk-2Bwbk-2BCb soil profile.

Backhoe Trench 4 is located on the T<sub>0</sub> surface. The profile reveals Ford sediments consisting of recent light yellowish brown fine to coarse sand (0–30 cm) overlying a 21-cm-thick, dark gray sandy clay loam soil (2Ab horizon). The soil rests on a clast-supported gravel bed.

### **Definition of Analysis Units**

Because the upper West Range and Ford alluvial units were defined within the test units excavated in Subarea B, two analysis units are defined. Analysis Unit 1 includes the cultural deposits within the Ford sediments from 0–90 cm in Test Unit 1 and from 0–110 cm in Test Unit 3; these materials correlate to the Late Prehistoric Toyah phase. Analysis Unit 2 consists of the upper West Range deposits from 90–150 cm in Test Unit 1 and from 105–160 cm in Test Unit 2; these materials correlate with the Late Prehistoric Austin phase.

### **Analysis Unit 1**

#### **Cultural Materials**

Artifacts recovered from Analysis Unit 1 include 228 flakes, 257 (51 kg) burned rocks, 3 modified mussel shells, a Scallorn and a Clifton arrow point, 3 bifaces (one of which is a two-

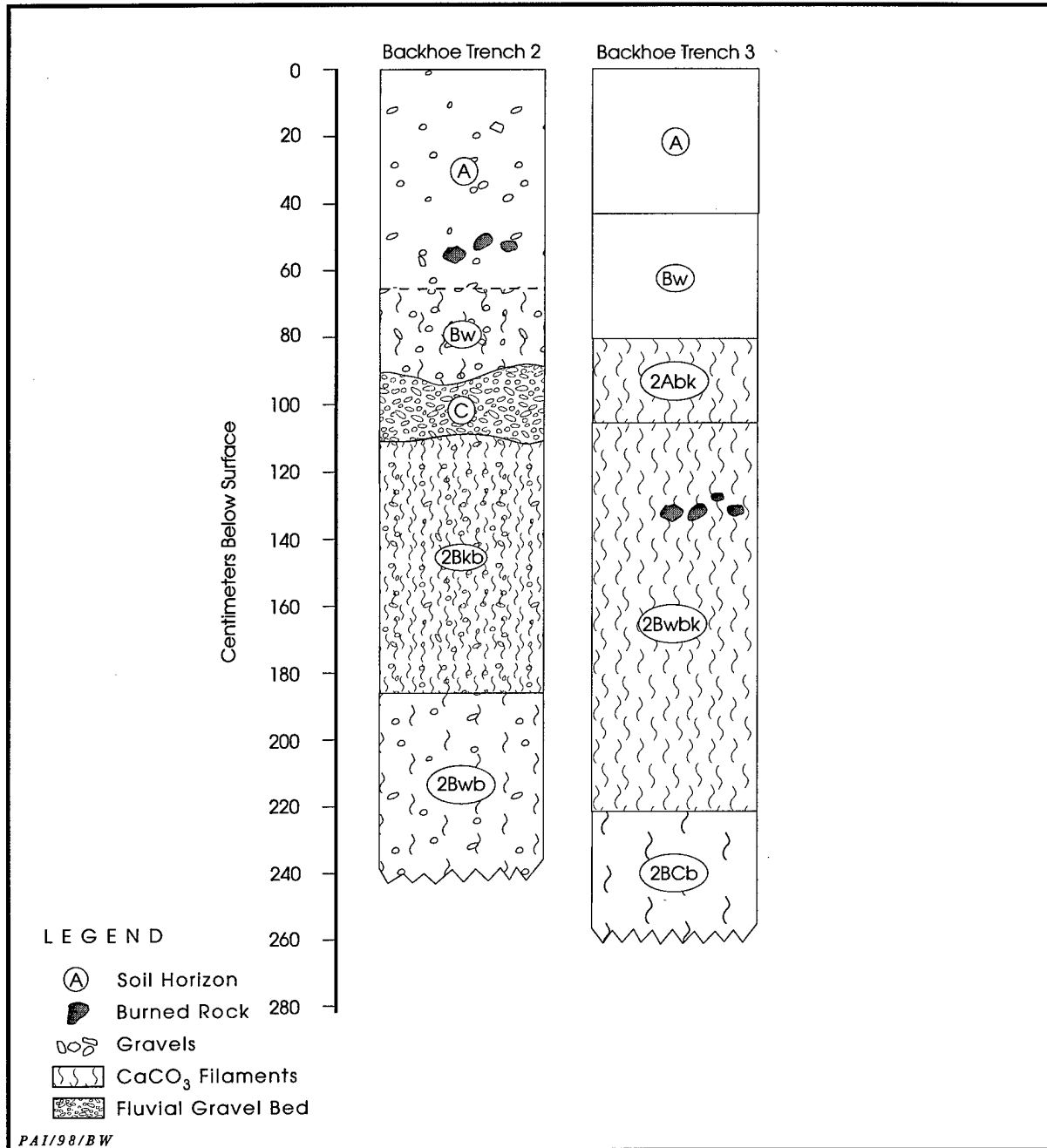


Figure 72. Profiles of Backhoe Trenches 2 and 3, 41CV1250.

beveled knife), 2 miscellaneous bifaces, 1 side scraper, 1 end/side scraper, 1 core tool, 1 multi-functional tool, 7 edge-modified flakes, and a piece of ground hematite (Table 28). Other materials recovered include 44 bones, with some elements identified as *Odocoileus* sp., *Sylvilagus* sp., *Anura*, and *Cricetidae* (see Appendix D), and

11 unmodified mussel shells. The vast majority of these artifacts and ecofacts were recovered from Feature 4 in Test Unit 1.

#### Cultural Features

Feature 4, interpreted as an occupation zone,

Table 28. Summary of cultural materials from 41CV1250, Analysis Unit 1

Provenience	Arrow Points	Bifaces	Unifaces	Core Tool	Multifunctional Tool	Edge-modified Flakes	Unmodified Debitage	Modified Hematite	Modified Shells	Unmodified Bones	Unmodified Shells	Totals
<b>TEST UNIT 1</b>												
Level 1 (0–10 cm)	–	–	–	–	–	–	–	–	–	–	–	0
Level 2 (10–20 cm)	–	–	–	–	–	–	–	–	–	1	–	1
Level 3 (20–30 cm)	–	1	1	–	–	–	–	–	–	9	–	11
Level 4 (30–40 cm)	–	–	–	–	–	–	–	–	–	–	–	0
Level 5 (40–50 cm)	–	–	–	–	–	–	–	–	–	–	–	0
Feature 4 (50–80 cm)	2	4	1	1	1	7	222	1	3	27	10	279
Level 9 (80–90 cm)	–	–	–	–	–	–	–	–	–	–	–	0
Subtotals	2	5	2	1	1	7	222	1	3	37	10	291
<b>TEST UNIT 3</b>												
Level 5 (40–50 cm)	–	–	–	–	–	–	–	–	–	1	1	2
Level 6 (50–60 cm)	–	–	–	–	–	–	–	–	–	6	–	6
Level 7 (60–70 cm)	–	–	–	–	–	–	1	–	–	–	–	1
Level 8 (70–80 cm)	–	–	–	–	–	–	–	–	–	–	–	0
Level 9 (80–90 cm)	–	–	–	–	–	–	3	–	–	–	–	3
Level 10 (90–100 cm)	–	–	–	–	–	–	2	–	–	–	–	2
Level 11 (100–110 cm)	–	–	–	–	–	–	–	–	–	–	–	0
Subtotals	0	0	0	0	0	0	6	0	0	7	1	14
Totals	2	5	2	1	1	7	228	1	3	44	11	305

was encountered from 50–80 cm in Test Unit 1. Although the feature encompassed the entire unit and portions were exposed along a 3-m section of the tributary cutbank adjacent to the unit, no estimate of its overall dimensions is made. The feature is capped by a 1–2-cm-thick layer of brown silt, probably representing an overbank flood episode. A total of 250 burned rocks (50.5 kg), 222 flakes, 27 bones, 13 mussel shells (of which 2 exhibit cutting and 1 is perforated), both of the arrow points (Clifton and Scallorn), 2 of the late-stage/finished bifaces, both of the miscellaneous bifaces, the side scraper, the core and multifunctional tool, all of the edge-modified flakes, the ground hematite, and an abundance of charcoal were recovered from the feature fill. Burned rocks range in size from small spalls to fragments as large as 15x10x5 cm. Charred *Quercus* sp. wood collected from 70–80 cm yielded a conventional radiocarbon age of  $590 \pm 50$  B.P. (Beta-102137; see Appendix A). Numerous macrobotanical remains (charred wood) were identified in a flotation sample, including charred *Celtis* sp., *Quercus* sp.,

Salicaceae, and Ulmaceae wood (see Appendix E).

### Discussion

The calibrated date of A.D. 1310–1415 from the base of Feature 4 places the age of the occupation zone in the Toyah interval of the Late Prehistoric. Although the date is somewhat young to be associated with a Scallorn point, the exact elevations and precise relationships between the point and the dated charcoal sample within this 10-cm level (70–80 cm) are not known. Furthermore, the Scallorn point may have been recycled by the later inhabitants. Although Feature 4 is fairly thick (50–80 cm) and probably represents the remains of one or more occupations, cultural materials (a beveled knife, an end/side scraper, and 10 bones) found at 20–30 cm are vertically discrete and probably represent a single Toyah occupation. Within Feature 4, identified macrobotanical remains include elm, hackberry, oak, and willow wood. Identifiable faunal elements consist of deer, cottontail rabbit, rat, and toad/frog. Although only

a few ( $n = 4$ ) of the bones recovered from 41CV1250 were burned, this site had a high frequency of spiral-fractured elements (see Appendix D). Mussel shells indicate a reliance on aquatic resources, and modifications of three specimens represent use of shells for ornamental purposes. Analysis Unit 1 encompasses intact and isolable components that contain diverse and well-preserved macrobotanical and faunal assemblages within Ford alluvium; these sediments hold an important record of Toyah phase life along House Creek.

### Analysis Unit 2

#### Cultural Materials

Artifacts recovered from Analysis Unit 2 include 41 flakes, 318 (98.5 kg) burned rocks, 3 late-stage/finished bifaces, 2 miscellaneous unifaces, 1 spokeshave, 3 edge-modified flakes, and 1 core (Table 29). Other cultural materials recovered include 17 bones (see Appendix D) and

1 unmodified mussel shell.

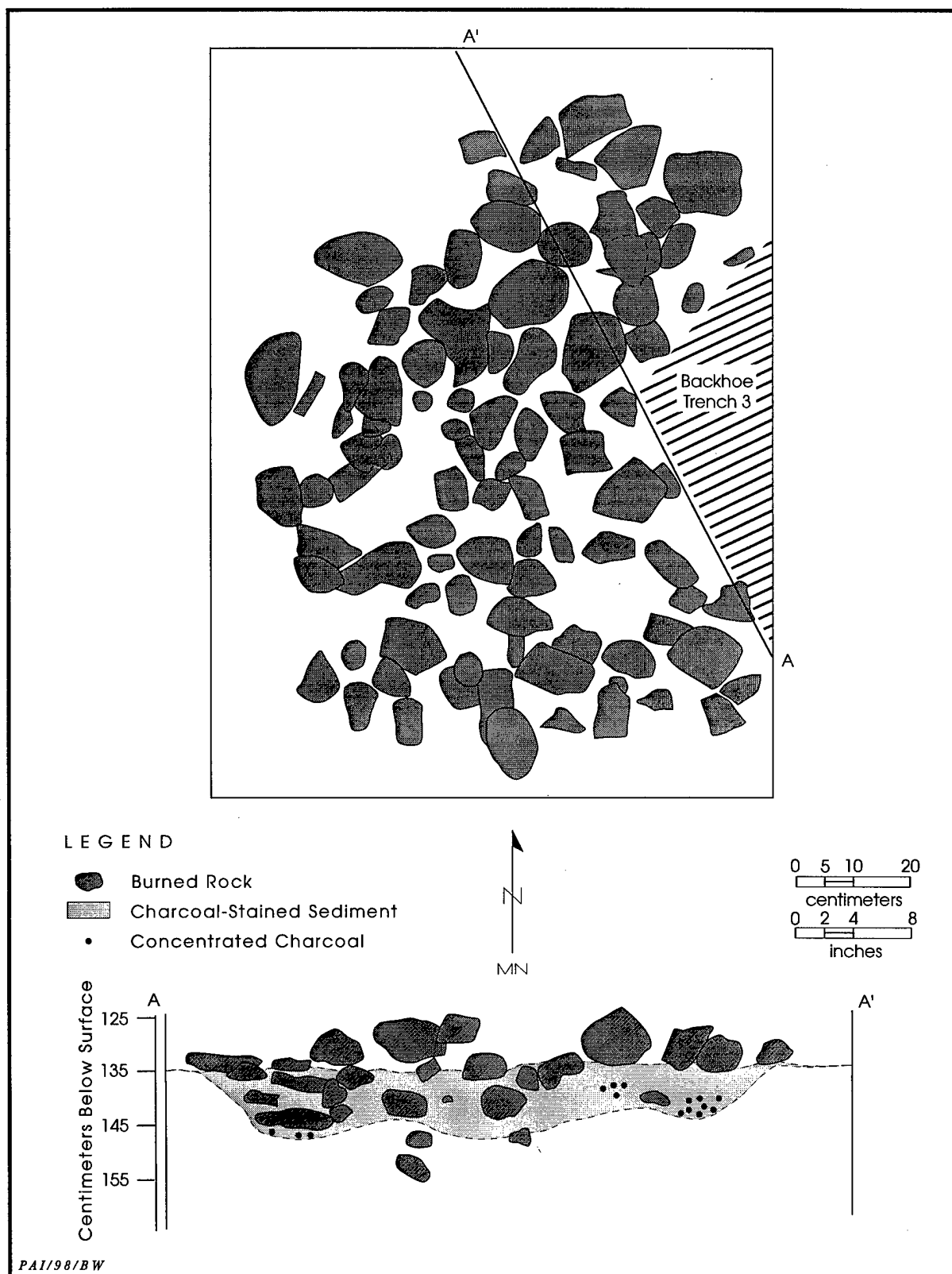
#### Cultural Features

Feature 7, interpreted as a circular basin-shaped hearth, was exposed from 100–117 cm in the southwestern quadrant of Test Unit 1. Although the eastern edge of the feature was lost to cutbank erosion, the excavated portion was defined by two layers of burned, tabular limestone rocks within a 50x40-cm area. The feature is estimated to have been approximately 90 cm in diameter. A total of 29 burned rocks (15 kg) were recorded; the largest of these measured 17x15x5 cm. The feature fill contained two flakes. Charcoal and flotation samples were collected from the feature fill, and a conventional radiocarbon age of  $1130 \pm 40$  B.P. was obtained from a charcoal sample (Beta-102138; see Appendix A).

Feature 5 was initially exposed in Backhoe Trench 3 and was encountered from 128–148 cm in Test Unit 2 (Figure 73). Feature 5 is a roughly

Table 29. Summary of cultural materials from 41CV1250, Analysis Unit 2

Provenience	Bifaces	Unifaces	Spokeshave	Edge-modified Flakes	Core	Unmodified Debiages	Unmodified Bones	Unmodified Shell	Totals
<b>TEST UNIT 1</b>									
Level 10 (90–100 cm)	–	–	–	–	–	–	–	–	0
Level 11 (100–110 cm)	1	–	1	2	–	19	5	1	29
Level 12 (110–120 cm)	–	–	–	–	–	6	10	–	16
Level 13 (120–130 cm)	–	–	–	–	–	–	–	–	0
Level 14 (130–140 cm)	–	–	–	–	–	–	–	–	0
Level 15 (140–150 cm)	–	–	–	–	–	1	–	–	1
Feature 7 (100–117 cm)	–	–	–	–	–	2	–	–	2
Subtotals	1	0	1	2	0	28	15	1	48
<b>TEST UNIT 2</b>									
Level 11 (105–110 cm)	1	–	–	–	1	1	–	–	3
Level 12 (110–120 cm)	–	–	–	–	–	2	–	–	2
Level 13 (120–130 cm)	–	–	–	–	–	2	1	–	3
Level 14 (130–140 cm)	1	1	–	1	–	1	1	–	5
Level 15 (140–150 cm)	–	–	–	–	–	–	–	–	0
Level 16 (150–160 cm)	–	–	–	–	–	1	–	–	1
Feature 5 (128–148 cm)	–	1	–	–	–	6	–	–	7
Feature 6 (137–148 cm)	–	–	–	–	–	–	–	–	0
Subtotals	2	2	0	1	1	13	2	0	21
<b>Totals</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>41</b>	<b>17</b>	<b>1</b>	<b>69</b>



**Figure 73.** Plan and profile of Feature 5 in Test Unit 2, 41CV1250.

circular (120x110 cm), basin-shaped hearth comprised of four layers of angular and subangular burned limestone rocks ranging in size from 4x3x2 cm to 16x10x5 cm. More than 155 burned rocks (56 kg), 6 flakes, and a miscellaneous uniface were recovered from the feature. A heavily oxidized layer of sediment, 5–7 cm thick and containing high concentrations of charcoal, was found in the central portion of the feature. A charcoal sample from this area yielded a conventional radiocarbon age of  $1210 \pm 40$  B.P. (Beta-102136; see Appendix A). Macrobotanical remains identified in a flotation sample include *Quercus* sp. and Salicaceae wood and nutshell fragments (see Appendix E).

Feature 6 was encountered from 137–148 cm in Test Unit 2. The feature was first exposed while removing charcoal-stained fill at the base of Feature 5. It appears that Feature 5 is intrusive into Feature 6. Although only a small portion of Feature 6 was excavated, it is evident that it is similar to Feature 5. It is also a roughly circular, basin-shaped hearth composed primarily of angular burned limestone. Heavy charcoal staining also was observed. Eleven small angular burned rocks (2.5 kg) were recorded from the excavated portion of the feature, which was 11 cm thick and measured 82 cm east-west by 26 cm north-south. No artifacts were associated with Feature 6.

### Discussion

The dates of A.D. 780–885 from Feature 5 and A.D. 885–980 from Feature 7 indicate that the Analysis Unit 2 cultural deposits in the upper West Range sediments are the remains of Late Prehistoric Austin phase occupations. As mentioned for Analysis Unit 1, Analysis Unit 2 also contains well-preserved and diverse macrobotanical and faunal remains, the majority of which are associated with intact cultural features and components.

### Summary and Conclusions

Site 41CV1250 is an extensive site located along House Creek. The previous investigators determined that the majority of the site (Subarea A) did not have the potential to contain intact cultural deposits. Current investigations focused on the late Holocene terrace along the east edge of the site (Subarea B). These investi-

gations have demonstrated that well-sealed and stratified Late Prehistoric Austin and Toyah phase components with diverse and well-preserved macrobotanical and economic remains are contained within this portion of the site. It is recommended that Subarea B of 41CV1250 be considered eligible for listing in the NRHP. Although this terrace contains a dense hardwood forest and is fairly well protected against major disturbances (e.g. tank traffic), it is currently being impacted by off-road vehicles (i.e., motorcycles), which promotes erosion. Because shallowly buried cultural materials (20–30 cm) are present, protective measures that would eliminate this adverse impact should be implemented.

### 41CV1269

#### Site Setting

Site 41CV1269 is situated on the south side of House Creek. House Creek defines the northern and western site boundaries. From the creek channel, the site extends across an extensive terrace onto an upland slope and encompasses a midslope bench at the southeastern site margin. With the exception of a dense strip of juniper and hardwood trees along House Creek, the terrace is open and covered with grasses. The upland slope and bench supports a hardwood and juniper forest. A few military trails traverse the western half of the site, and two heavily vandalized burned rock middens (Features 1 and 2) are present at the eastern margin of the site. Site elevation is 270–285 m above mean sea level.

#### Previous Work

McCabe and Mesrobian (Texas A&M University) recorded the site on 2 June 1986 as containing two vandalized burned rock middens with associated burned rock and lithic scatters. One of the middens was situated within the terrace at the base of the toeslope and the other was located on an upland-slope bench. A high density of cultural materials was observed on spoil piles, including debitage, burned rocks, bifaces, unifaces, mussel shells, and burned bones. A fragment of a dart point and a metate were collected. Site size was defined as 370 m east-west by 160 m north-south, and it was estimated to be 45 percent disturbed by vandalism,

erosion, and vehicular traffic.

The site was revisited on 16 June 1992 by Trierweiler and Frederick (Mariah Associates) for archeological and geomorphological reconnaissance and assessment. Site dimensions were changed to 400 m east-west by 170 m north-south. Based on the presence of different geomorphic contexts, the site was divided into Subarea A and B.

Subarea A was described as a floodplain-terrace-colluvial toeslope complex. Ford and West Range alluvium (Nordt 1992) was observed in cutbank exposures along House Creek. A soil exposed in the toeslope was noted to be a cumulic, possibly anthropic, A horizon. The burned rock midden (Feature 1) located at the base of the colluvial slope was estimated to measure 50x10 m. Although the thickness of this midden was estimated to be 1 m or more, its depth was difficult to determine due to the hummocky surface left by numerous potholes. Abundant artifacts and ecofacts, including burned bones, lithics, and mussel shells, were exposed on the surface and in the dark, organic-rich feature matrix. Undisturbed deposits were noted between potholes and backdirt piles.

Subarea B was described as a stair-stepped, erosional slope at the southeastern margin of the site. This portion of the site was underlain by A-R and O-A-AC-R profiles formed in colluvium on the gently sloping bench above the steep slope. Bedrock was exposed over much of the area, but preserved patches of sediment/soil were interspersed. Feature 2, a ca. 10-m-diameter burned rock midden or mound, was located at the crest of the colluvial slope. This feature was observed to be heavily disturbed by vandalism and overgrown with vegetation. Its depth was estimated to be as much as 50 cm. The potential for encountering *in situ* cultural remains in Subarea B was thought to be restricted to a relatively small, gently sloping bench area, since the steeper slopes precluded the preservation of the occupational remains.

A crew returned on 24 June 1992 and excavated 30 shovel tests in Subarea A and 3 shovel tests in Subarea B. Of the 30 shovel tests excavated in Subarea A, 27 were excavated across the terrace and 3 were placed in Feature 1. Only 3 of the 27 (11 percent) terrace tests were positive, but 1 of these revealed cultural materials to a depth of 60 cm. All 3 shovel tests excavated in Feature 1 were positive, with cultural mate-

rials recovered to a depth of 50 cm. However, 2 of the 3 tests appeared to have been excavated in vandalized deposits. The 3 shovel tests in Subarea B were all excavated in apparently undisturbed portions of Feature 2. Cultural materials were recovered to a depth of ca. 40 cm in 2 of these tests; the third test was sterile.

Both subareas of site 41CV1269 were found to have buried archeological deposits of unknown significance and were recommended as potentially eligible for NRHP nomination. A minimum testing effort of 6–8 m<sup>2</sup> of manually excavated test units in Features 1 (Subarea A) and 2 (Subarea B) and eight backhoe trenches in the alluvial terrace (Subarea A) was recommended for formal testing to determine the NRHP eligibility of the site (Trierweiler, ed. 1994:A1402–A1404).

### Work Performed

Formal testing of 41CV1269 was completed by Prewitt and Associates on 1 October 1996 (Figure 74). Six backhoe trenches (Backhoe Trenches 1–6) and three manually dug test units (Test Unit 1–3) were excavated in Subarea A, and two trenches (Backhoe Trench 7–8) and one manually dug test unit (Test Unit 4) were excavated in Subarea B. Approximately 6 m<sup>3</sup> was manually excavated.

Backhoe Trench 1 (15.0x0.8x2.0 m) was oriented to 355° and excavated on the T<sub>1</sub> surface immediately downslope (north) of the vandalized portion of Feature 1. A few burned rocks and flakes were observed from 0–60 cm at the south end of this trench. Backhoe Trench 2 (25.0x0.8x2.5 m) was oriented to 328° and bisected the vandalized surface exposure of Feature 1 from the base of the toeslope onto the terrace. Although Feature 1 was exposed throughout the length of the trench at varying depths from 0–150 cm, only a few meters of intact midden deposits were observed at the toeslope end of the trench. A small ash anomaly (Feature 4) was located at 100 cm within these disturbed deposits. In addition, a hearth (Feature 3) was exposed below Feature 1 from 140–180 cm in both of the trench walls. The vandalized midden deposits above this hearth were subsequently removed by the backhoe to facilitate excavation of the intact deposits below. Artifacts collected from the backdirt of Backhoe Trench 2 included four Castroville, one Ensor,

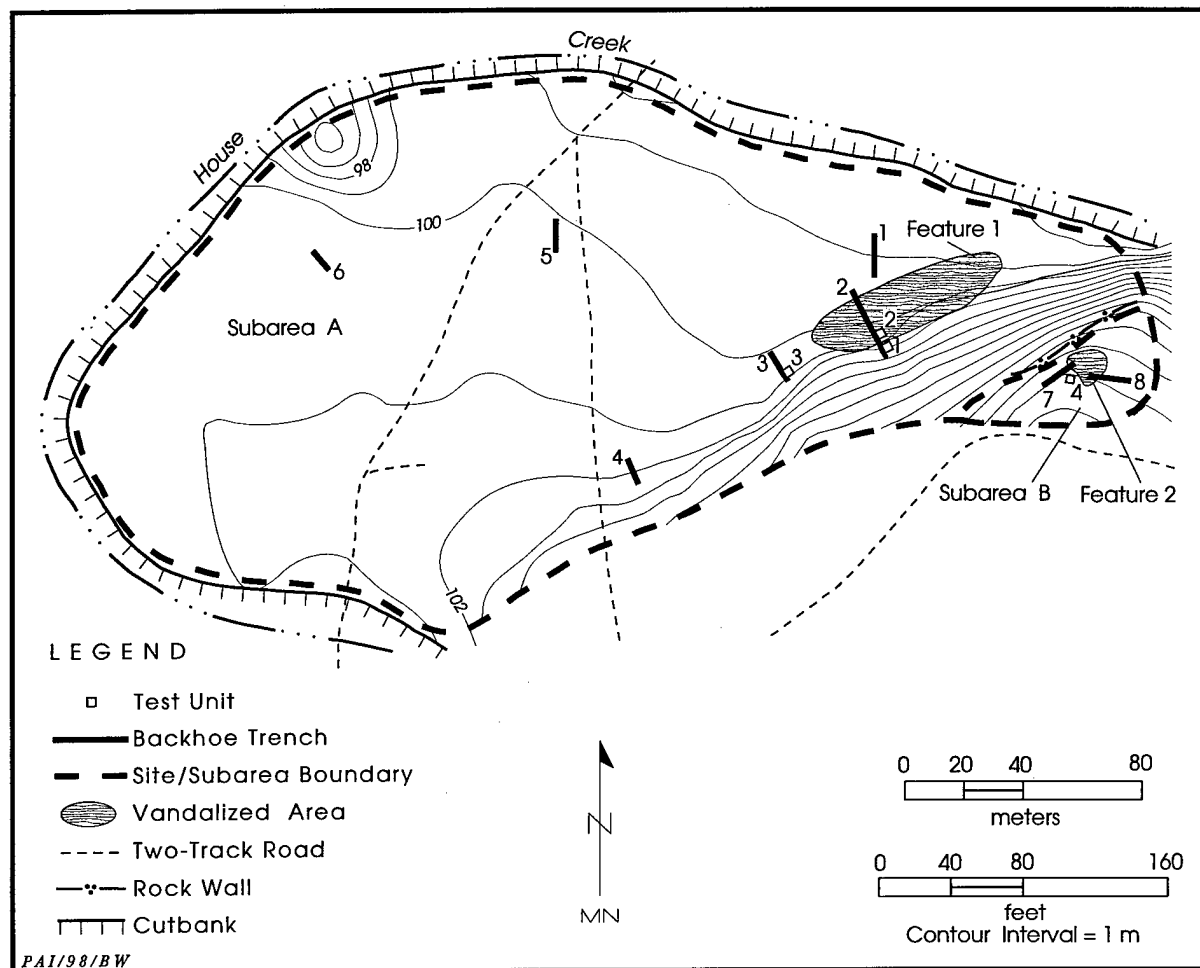


Figure 74. Site map, 41CV1269.

four Marshall, one Montell, three Pedernales, one untypeable dart point, and one late-stage/finished biface.

Backhoe Trench 3 (12.0x0.8x3.4m, oriented to 327°) was excavated from the base of the toeslope out onto the terrace approximately 30 m west of Backhoe Trench 2. Although no discrete features were discerned in the profiles, dense cultural materials (primarily burned rocks, flakes, and charcoal) were exposed throughout the trench walls. Backhoe Trench 4 (10.0x0.8x2.7 m) was oriented to 337° and placed at the base of the toeslope approximately 60 m west of Backhoe Trench 3. Backhoe Trench 5 (11.0x1.5x3.0 m) was oriented to 356° and placed at the center of the terrace. Backhoe Trench 6 (9.0x0.8x2.5 m) was oriented to 323° and placed at the north-west margin of the terrace. No cultural materi-

als were exposed in Backhoe Trenches 4–6.

Backhoe Trenches 7 and 8 were excavated to bedrock on the midslope bench in Subarea B. Backhoe Trench 7 (12.0x0.8x1.0 m) was oriented to 231° and excavated a few meters southwest of the vandalized portion of Feature 2. Backhoe Trench 8 (15.0x0.8x1.3 m) was oriented to 270° and placed on the eastern side of the vandalized portion of Feature 2. Feature 2 was present only in the eastern 6 m of Backhoe Trench 7 and the western ca. 7 m of Backhoe Trench 8. Although the portion of the feature in Backhoe Trench 7 was intact, over half (4 out of the 7 m) of the midden exposure in Backhoe Trench 8 was vandalized. Artifacts collected from Backhoe Trench 7 include an Edgewood and a Marcos dart point from the backdirt. A piece of ground hematite was recovered from the north wall at



50 cm within Feature 2. An end/side scraper was collected from the backdirt of Backhoe Trench 8. The profiles of Backhoe Trenches 2, 5, 6, and 7 were described and soil geomorphology was assessed.

All of the test units excavated in Subarea A were placed on or adjacent to the burned rock midden (Feature 1) located along the interface of the toeslope and terrace at the eastern margin of the site. Test Units 1 and 2 were oriented with and placed along the east wall of Backhoe Trench 2. Test Unit 1 was excavated above the intact portion of Feature 1 that contained the ash anomaly (Feature 4). It was excavated as a 1.0x0.5-m unit until the safety bench was reached at 100 cm and then was expanded to a 1x1-m unit from 100–170 cm. Test Unit 2 was placed over the eastern portion of the hearth (Feature 3) below Feature 1. It was excavated as a 1.5x1.0-m unit from 140–180 cm, then as a 1x1-m unit from 180–200 cm. The vandalized overburden above Feature 3 was mechanically removed to a depth of 140 cm to facilitate excavation. Test Unit 3 (1x1-m unit) was oriented with and placed along the east wall of Backhoe Trench 3 and excavated from 140–300 cm. In Subarea B, Test Unit 4 (1x1-m unit) was placed between Backhoe Trenches 7 and 8, approximately 1 m upslope (south) from the southern edge of the vandalized deposits of Feature 2. It was excavated to bedrock at 83 cm.

### **Sediments and Stratigraphy**

The sediments and stratigraphy at 41CV1269 consist of Ford and lower West Range alluvium within the  $T_1$  (Subarea A), late Holocene colluvium at the toeslope of the valley wall (Subarea A), and colluvial and anthropogenic deposits on a limestone bench on the upper valley wall slope (Subarea B).

The described profiles of Backhoe Trenches 5 and 6 (see Appendix B) are representative of the  $T_1$  terrace. The profile of Backhoe Trench 5 consists of a 28-cm-thick drape of Ford alluvium overlying lower West Range alluvium (28–275+ cm). The Ford deposit is a very dark gray clay loam exhibiting an A horizon. The lower West Range deposits consist of interbedded clast-supported gravel beds and dark loamy alluvium. The dark loamy alluvium is imprinted with a 2Ab-2Bwb soil profile. The profile of Backhoe Trench 6 consists of a 61-cm-thick drape of Ford

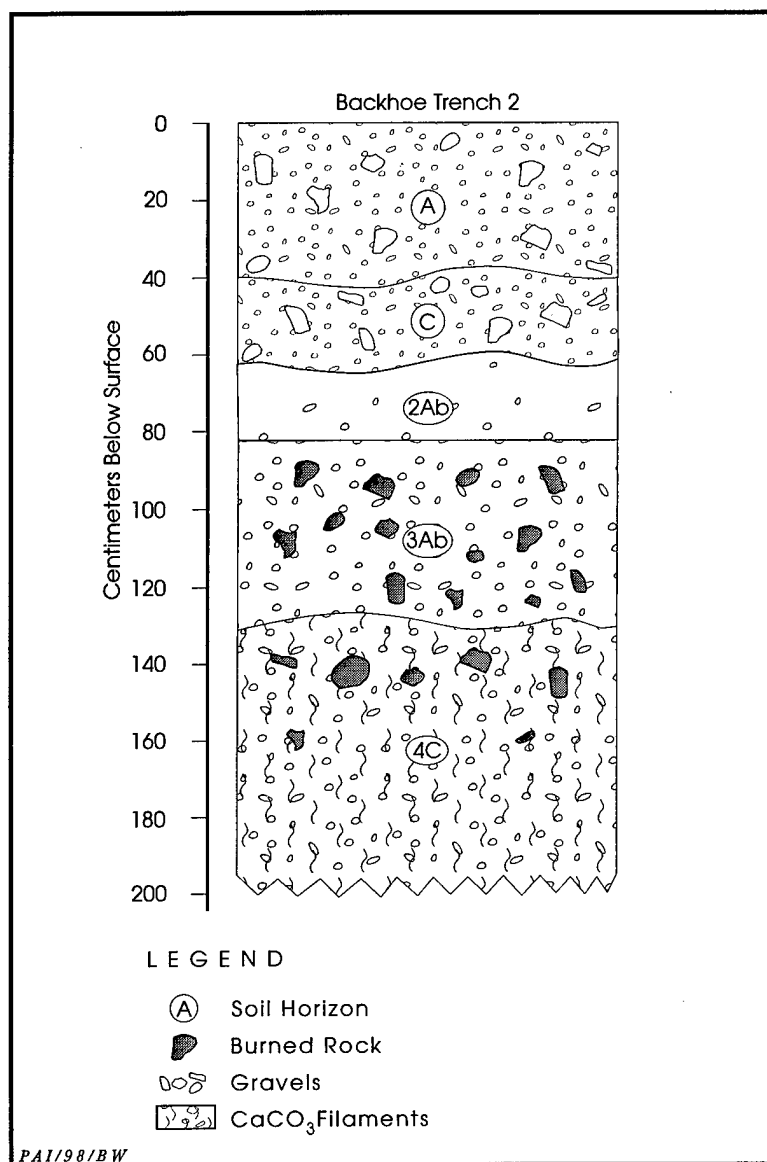
alluvium and underlying deposits of lower West Range alluvium (61–230+ cm). The Ford deposit is comprised of a dark gray clay loam and grayish brown silty clay loam imprinted with an A-B soil. The lower West Range alluvium is an upward-coarsening deposit of light yellowish brown muddy sand, very pale brown gravelly muddy sand, and clast-supported gravel bed.

The profiles of Backhoe Trenches 2 and 3 revealed a thick drape of fine-grained colluvium and matrix-supported gravels that pinch out northward on the  $T_1$  surface. This colluvial drape encapsulates much of the cultural material at the site. The sediments and stratigraphy of the colluvium were examined in the profile of Backhoe Trench 2 (Figure 75), which reveals a series of late Holocene colluvial units (0–130 cm) overlying lower West Range alluvium (130–195+ cm). The colluvial deposits have been disturbed by vandalism. The upper late Holocene colluvial unit is a 61-cm-thick dark gray to grayish brown clay loam containing matrix-supported gravels and imprinted with an A-C soil profile. The underlying colluvial unit (61–82 cm) is a 21-cm-thick dark gray clay loam imprinted with a 2Ab horizon. The basal colluvial unit (82–130 cm) is a very dark gray silty clay loam exhibiting a 3Ab horizon. The basal unit also has an anthropogenic component comprised of abundant burned rocks and charcoal. A very abrupt smooth boundary separates this basal colluvial unit from the underlying deposit of lower West Range alluvium. The lower West Range alluvium (130–195+ cm) is a pale brown clay loam, which grades laterally to a clast-supported gravel bed at the northern end of the trench.

In Subarea B, the 70-cm-thick profile of Backhoe Trench 7 revealed an anthropogenic zone of densely packed burned rocks and charcoal and in situ silty clay loam overlying weathered Walnut Formation. The anthropogenic A horizon has a maximum thickness of 70 cm and pinches out at the eastern end of the trench.

### **Definition and Interpretation of Analysis Units**

Site 41CV1269 covers an area 360 m east-west by 180 m north-south; most of this area is subsumed within Subarea A. Based on the differing geomorphic surfaces in Subareas A and B and differing ages of occupations within the deposits of Subarea A, three analysis units are



**Figure 75.** Profile of Backhoe Trench 2, 41CV1269.

defined for this site. Analysis Unit 1 consists of the upper deposits (Late Archaic) in the colluvial toeslope/terrace in Subarea A. These deposits are exposed from 0–80 cm in Test Unit 1 and 0–140 cm in Test Unit 3. Analysis Unit 2 consists of the lower deposits (Middle Archaic) along the colluvial toeslope/terrace interface in Subarea A. These deposits are exposed from 80–170 cm in Test Unit 1, 140–200 cm in Test Unit 2, and 140–300 cm in Test Unit 3. Analysis Unit 3 includes all of the deposits exposed in Test Unit 4, excavated on the midslope bench in Subarea B.

## Analysis Unit 1

### *Extent and Depth*

The actual areal extent of the cultural deposits comprising Analysis Unit 1 is not known. It is estimated that these deposits encompass, at a minimum, an area of approximately 100 m east-west by 30 m north-south. Test Units 1 and 3 fall within this area. Cultural materials were recovered from each 10-cm level from 0–80 cm in Test Unit 1 and from 20–140 cm in Test Unit 3.

### *Cultural Materials*

Artifacts recovered include 81 flakes, 120 burned rocks (10.5 kg), 1 perforator, 1 late-stage/finished biface, 1 miscellaneous biface, 1 end scraper, 1 miscellaneous uniface, 1 multifunctional tool, and 3 edge-modified flakes (Table 30). Other cultural materials collected include 8 bones (see Appendix D).

### *Discussion*

A fairly uniform scatter of cultural materials was found in each of the levels defined in this analysis unit. A perforator found at 100–110 cm in Test Unit 3 is recycled on a Castroville dart point; no other diagnostic artifacts were recovered from this

analysis unit. A charcoal sample collected from 60–70 cm in Test Unit 1 yielded a radiocarbon date of 785–540 B.C. (Beta 102140-L; see Appendix A). Thus, the cultural materials recovered from Analysis Unit 1 probably represent a stratified series of Late Archaic occupations.

## Analysis Unit 2

### *Extent and Depth*

The size of the area encompassing Analysis

Table 30. Summary of cultural materials from 41CV1269, Analysis Unit 1

Provenience	Perforator	Late-stage/ Finished Biface	Miscellaneous Biface	End Scraper	Miscellaneous Uniface	Multifunctional Tool	Edge-modified Flakes	Unmodified Debitage	Unmodified Bones	Totals
<b>TEST UNIT 1</b>										
Level 1 (0–10 cm)	–	–	–	–	–	–	–	–	–	0
Level 2 (10–20 cm)	–	–	–	–	–	–	–	7	–	7
Level 3 (20–30 cm)	–	–	–	–	–	–	–	7	3	10
Level 4 (30–40 cm)	–	–	–	–	–	–	–	4	–	4
Level 5 (40–50 cm)	–	–	–	–	–	–	–	4	–	4
Level 6 (50–60 cm)	–	–	–	–	–	–	–	7	–	7
Level 7 (60–70 cm)	–	–	–	1	–	1	–	6	1	9
Level 8 (70–80 cm)	–	1	1	–	–	–	–	6	4	12
Subtotals	0	1	1	1	0	1	0	41	8	53
<b>TEST UNIT 3</b>										
Level 3 (20–30 cm)	–	–	–	–	–	–	–	1	–	1
Level 4 (30–40 cm)	–	–	–	–	–	–	–	3	–	3
Level 5 (40–50 cm)	–	–	–	–	–	–	–	5	–	5
Level 6 (50–60 cm)	–	–	–	–	–	–	–	–	–	0
Level 7 (60–70 cm)	–	–	–	–	–	–	–	4	–	4
Level 8 (70–80 cm)	–	–	–	–	–	–	–	–	–	0
Level 9 (80–90 cm)	–	–	–	–	–	–	–	1	–	1
Level 10 (90–100 cm)	–	–	–	–	–	–	–	3	–	3
Level 11 (100–110 cm)	1	–	–	–	1	–	3	11	–	16
Level 12 (110–120 cm)	–	–	–	–	–	–	–	8	–	8
Level 13 (120–130 cm)	–	–	–	–	–	–	–	2	–	2
Level 14 (130–140 cm)	–	–	–	–	–	–	–	2	–	2
Subtotals	1	0	0	0	1	0	3	40	0	45
Totals	1	1	1	1	1	1	3	81	8	98

Unit 2 is not well defined, but corresponds with the area defined for Analysis Unit 1. The Analysis Unit 2 area encompasses Test Units 1–3 and all of burned rock midden Feature 1. It measures approximately 100 m east-west by 30 cm north-south. Cultural materials were found in each of the excavation levels defined for Analysis Unit 2 in Test Units 1–3. The top of the Analysis Unit 2 cultural deposits varies from 80 cm (Test Unit 1) to 140 cm (Test Units 2 and 3), and the cultural deposits are at least 1–1.5 m thick.

#### Cultural Materials

A large and diverse assemblage of cultural materials was recovered from Analysis Unit 2 deposits (Table 31). Recovery included 881 flakes, 1,260 burned rocks (298.5 kg), 4 dart points, 32 chipped stone tools, 1 mano, and 1 mano/ham-

merstone. The dart points are identified as 2 Pedernales, a Travis, and a Provisional Type 1. Faunal remains recovered include 163 bones (see Appendix D) and 1 unmodified mussel shell.

#### Cultural Features

Feature 1 is estimated to measure 70 m northeast-southwest by 30 m northwest-southeast based on the vandalism exposures, test unit excavations, and the geomorphic position of the feature along a discontinuous colluvial terrace/toeslope contact. Within Test Unit 1, Feature 1 was encountered from 80–150 cm. A total of 469 burned rocks (82 kg), 74 flakes, 1 Pedernales point, 1 edge-modified flake, 1 mano, and 23 bone fragments were recovered from the feature matrix. The vast majority of the burned rocks were angular and blocky fractured pieces

Table 31. Summary of cultural materials from 41CV1269, Analysis Unit 2

Provenience	Dart Points	Early/Middle-stage Bifaces	Late-stage/Finished Bifaces	Miscellaneous Bifaces	End Scraper	Miscellaneous Unifaces	Graver/Burin	Edge-modified Flakes	Core	Unmodified Debitage	Ground Stone Tools	Unmodified Bones	Unmodified Shell	Totals
<b>TEST UNIT 1</b>														
Feature 1 (80-90 cm)	-	-	-	-	-	-	-	-	-	11	-	14	-	25
Feature 1 (90-100 cm)	-	-	-	-	-	-	-	1	-	4	-	1	-	6
Feature 1 (100-110 cm)	-	-	-	-	-	-	-	-	-	6	-	2	-	8
Feature 1 (110-120 cm)	1	-	-	-	-	-	-	-	-	25	-	4	-	30
Feature 1 (120-130 cm)	-	-	-	-	-	-	-	-	-	19	-	-	-	19
Feature 1 (130-140 cm)	-	-	-	-	-	-	-	-	-	8	-	2	-	10
Feature 1 (140-150 cm)	-	-	-	-	-	-	-	-	-	1	1	-	-	2
Level 16 (150-160 cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Level 17 (160-170 cm)	-	-	1	-	-	-	-	1	-	-	-	-	-	2
Feature 4 (103-150 cm)	-	-	-	1	-	-	-	-	-	-	-	3	-	4
Subtotals	1	0	1	1	0	0	0	2	0	74	1	26	0	106
<b>TEST UNIT 2</b>														
Level 15 (140-150 cm)	-	-	1	-	-	-	-	-	-	17	-	-	-	18
Level 16 (150-160 cm)	-	-	-	-	-	-	-	-	1	15	-	1	1	18
Level 17 (160-170 cm)	-	-	-	-	-	-	-	1	-	16	-	23	-	40
Level 18 (170-180 cm)	-	1	-	-	-	-	-	-	-	27	-	17	-	45
Level 19 (180-190 cm)	1	-	-	-	-	1	-	3	-	30	-	-	-	35
Level 20 (190-200 cm)	-	-	-	-	-	-	-	-	-	7	-	-	-	7
Feature 3 (140-180 cm)	-	-	-	-	-	-	-	1	-	36	-	21	-	58
Subtotals	1	1	1	0	0	1	0	5	1	148	0	62	1	221
<b>TEST UNIT 3</b>														
Level 15 (140-150 cm)	-	-	-	-	-	-	-	-	-	6	-	-	-	6
Level 16 (150-160 cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Level 17 (160-170 cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Level 18 (170-180 cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Level 19 (180-190 cm)	-	-	-	-	-	-	-	1	-	11	-	-	-	12
Level 20 (190-200 cm)	-	-	1	-	-	-	-	-	-	19	-	-	-	20
Level 21 (200-210 cm)	-	-	-	-	-	-	-	-	-	19	-	-	-	19
Level 22 (210-220 cm)	-	-	1	-	-	-	-	-	-	49	-	2	-	52

Table 31, continued

Provenience	Dart Points	Early/Middle Stage Bifaces	Late Stage/ Finished Bifaces	Miscellaneous Bifaces	End Scrapers	Miscellaneous Unifaces	Graver/Burins	Edge-Modified Flakes	Cores	Unmodified Debitage	Ground Stone Tools	Unmodified Bones	Unmodified Shells	Totals
TEST UNIT 3, continued														
Level 23 (220-230 cm)	-	-	-	-	1	-	-	-	-	36	-	1	-	38
Level 24 (230-240 cm)	1	1	-	-	-	-	-	1	-	166	-	5	-	174
Level 25 (240-250 cm)	1	-	-	-	-	-	1	3	-	183	-	42	-	230
Level 26 (250-260 cm)	-	1	-	2	-	2	-	2	-	74	-	20	-	99
Level 27 (260-270 cm)	-	-	-	1	-	-	-	-	-	60	-	5	-	66
Level 28 (270-280 cm)	-	-	-	-	-	-	-	1	-	10	-	-	-	11
Level 29 (280-290 cm)	-	-	-	-	-	-	-	-	-	3	-	-	-	3
Level 30 (290-300 cm)	-	-	-	-	-	-	-	-	-	1	-	-	-	1
Feature 5 (140-182 cm)	-	-	1	-	-	-	-	-	-	22	1	-	-	25
Subtotals	2	2	3	1	1	3	1	8	0	659	1	75	0	756
Totals	4	3	5	2	1	4	1	15	1	881	2	163	1	1,083

measuring 5–15 cm in diameter. No patterning of the rocks was recognized. The ratio of fine-grained matrix to burned rocks within Feature 1 is 4:1. Only one of the bones was identified to species, that being *Bison*. Four flotation and three charcoal samples were collected. A sample of charcoal from the base of the midden at 140–150 cm yielded a conventional radiocarbon age of  $3690 \pm 50$  B.P. (Beta-102141; see Appendix A). *Quercus* sp. wood was identified in a flotation sample (see Appendix E).

Feature 4, an ash anomaly, was encountered at 103–150 cm in Test Unit 1. It is entirely contained within the matrix of Feature 1. Contained within a 25-cm-diameter area at the central portion of the unit, Feature 4 consisted of loosely compacted, ashy stained sediment from 103–118 cm. A miscellaneous biface and three bones were recovered from the feature at this elevation. The ash became less prevalent below 118 cm, and the unconsolidated matrix tapered toward the base at 150 cm, where it ultimately turned at a 90° angle. This abrupt angle suggests that Feature 4 is the result of burrowing animals, although it was not determined whether the ashy fill is a product of natural or cultural burning. A flotation sample was collected and submitted for analysis; only charred hardwood fragments were noted (see Appendix E).

Within Test Unit 2, Feature 3 (hearth) extends from 140–180 cm and its excavated dimensions are 150x72 cm. The morphology of this rock-filled feature was circular and basin shaped (Figure 76). A total of 146 burned rocks (82 kg) were recovered. While the upper one or two layers of rocks were mainly angular fractured pieces, the lower and more-central two layers consisted of fractured tabular pieces and intact slabs ranging in size from 10x15x4 cm to 25x18x5 cm. Its overall size is estimated to be ca. 155 cm in diameter, since the western edge of the hearth was exposed in the west wall of Backhoe Trench 2. Charcoal was observed throughout the feature matrix, but the lower central portion contained the highest quantity. Charred *Juniperus* sp. and

*Quercus* sp. woods were identified in a flotation sample (see Appendix E), and a conventional radiocarbon age of  $3720 \pm 50$  B.P. was obtained on the charcoal (Beta-102139; see Appendix A). Recovery from the feature matrix included 36 flakes, 1 edge-modified flake, and 21 bones. A Pedernales dart point was recovered below the feature at 180–190 cm.

Within Test Unit 3, a burned rock concentration (Feature 5) was encountered at ca. 140–150 cm and continued to 182 cm. Within the unit, the burned rocks (two to three coarses thick) sloped rather sharply from the southwest to the northeast. Although the vast majority of the rocks were angular and fist sized, some tabular pieces (up to 25x20x4 cm) were present. Overall, 434 burned rocks (99 kg) were recovered. The actual size of Feature 5 is unknown since burned rocks extended into all walls of the test unit. Recovery from feature matrix included 22 flakes, 1 late-stage/finished biface, 1 miscellaneous biface, and 1 mano/hammerstone. A conventional radiocarbon age of  $3750 \pm 50$  B.P. was obtained on charcoal from the feature (Beta-102144; see Appendix A).

### Discussion

The chronology of the Analysis Unit 2 cultural deposits is defined by three tightly clustered radiocarbon dates which calibrate to 2135–

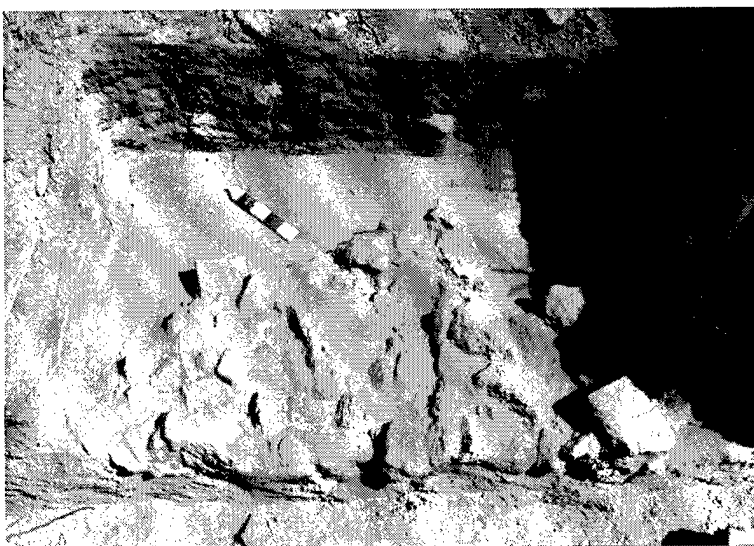


Figure 76. View northeast of Feature 3 in Test Unit 2, 41CV1269.

1975 B.C., 2175–2025 B.C., and 2205–2040 B.C. (corresponding to Features 1, 3, and 5, respectively). The first date is from the base of the Feature 1 midden, while the other two dates are from features found at or below the level of the midden. Consequently, it appears that the earliest occupations date to the Nolan/Travis interval of the Middle Archaic period (see Figure 3). It also appears that the accumulation of the midden began during this time. No radiocarbon dates were obtained for the upper portion of the midden, but the associated projectile points indicate that the occupations began during the Middle Archaic and lasted well into the Late Archaic.

One Pedernales point was found at 118 cm in the Feature 1 midden, well above the bottom of the midden (at 140–150 cm) and its corresponding Middle Archaic radiocarbon date. This indicates that most of the upper portion of the midden probably accumulated during Late Archaic times. In addition, 13 other Late Archaic dart points found in backdirt piles from Backhoe Trench 2 also are likely to be associated with the midden and provide evidence of intensive occupations during much of the Late Archaic period. It is noteworthy that a second Pedernales point was found in situ at 180–190 cm, directly below hearth Feature 3 and its corresponding Middle Archaic radiocarbon date. This find seems out of stratigraphic context but is perhaps not too surprising given that midden deposits are often quite mixed (note that another Pedernales point was found with burned rock concentration Feature 3 at 41CV1235 and is associated with a Middle Archaic radiocarbon date).

Analysis Unit 2 represents multiple stratified occupation episodes during the Middle and Late Archaic periods. Well-preserved macrobotanical and faunal remains associated with these occupations indicate that Analysis Unit 2 has a high research potential.

### **Analysis Unit 3**

Analysis Unit 3 includes all cultural materials encountered in Subarea B. Test Unit 4 was placed within burned rock midden Feature 2, located on the midslope bench. A single large spoil pile, surrounded by a continuous vandal trench, was present in the central portion of this feature. An Alba arrow point and one Edgewood dart point were collected from the surface of this

spoil pile.

### **Extent and Depth**

Subarea B covers ca. 80x30 m, but Analysis Unit 3 is a relatively small area encompassing 40 m northeast-southwest by 25 m northwest-southeast. All of Feature 2 is included in this analysis unit, and cultural materials were recovered from 10–83 cm in Test Unit 4.

### **Cultural Materials**

High frequencies of artifacts were recovered from Test Unit 4, including 1,116 flakes, 1 untypeable arrow point, 4 untypeable and 1 Castroville dart points, and 39 chipped stone tools (Table 32). Other materials recovered include 83 bones (see Appendix D) and 1 mussel shell; also, 804 burned rocks (170 kg) were observed. The overwhelming majority of these items were recovered from the burned rock midden (Feature 2) or were associated with an internal hearth (Feature 6). The Castroville point was found at 40–50 cm. Additional artifacts associated with Analysis Unit 3 (surface collected or from backhoe trenches) consist of 1 Alba, 1 Marcos, and 2 Edgewood points, 1 ground piece of hematite, and an end/side scraper.

### **Cultural Features**

Based on the excavation results and the maximum extent of fine-grained sediments on the midslope bench, the maximum size of Feature 2 is approximately 20 m in diameter. Within Test Unit 4, Feature 2 was encountered from 20–83 cm, but an internal hearth (Feature 6) was encountered from 60–83 cm. From 20–60 cm, 637 burned rocks (81.5 kg) were recovered from the midden. Although the majority ( $n = 435$ ) of these were small ( $<5$  cm in diameter) angular pieces, others were within size ranges of 5–15 cm ( $n = 195$ ) and 15–25 cm ( $n = 7$ ). Only three intact or unfractured rocks were noted. Flotation samples recovered from the midden yielded charred wood from *Quercus fusiformis*, *Quercus* sp., *Juniperus* sp., and *Salicaceae* (see Appendix E). A charcoal sample collected from the top level of the midden (20–30 cm) yielded a conventional radiocarbon age of  $720 \pm 50$  B.P. (Beta-102142; see Appendix A).

At 60 cm, bedrock covered all but an arc-shaped area at the northern half of the unit. The

Table 32. Summary of cultural materials from 41CV1269, Analysis Unit 3

Provenience	Arrow Points	Dart Points	Early/Middle-stage Biface	Late-stage/Finished Bifaces	Miscellaneous Bifaces	Side Scraper	End/Side Scraper	Miscellaneous Unifaces	Spokeshave	Graver/Burin	Multifunctional Tool	Edge-modified Flakes	Core	Unmodified Debitage	Modified Hematite	Unmodified Bones	Unmodified Shells	Totals
<b>TEST UNIT 4</b>																		
Level 1 (0-10 cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Level 2 (10-20 cm)	-	-	-	-	-	-	-	-	1	1	-	-	-	7	-	-	-	9
Feature 2 (20-30 cm)	1	1	1	-	2	-	-	2	-	-	-	4	1	173	-	3	-	188
Feature 2 (30-40 cm)	-	-	-	2	-	-	-	2	-	-	-	1	-	140	-	3	1	149
Feature 2 (40-50 cm)	-	1	-	2	2	-	-	2	-	-	1	4	-	207	-	28	-	247
Feature 2 (50-60 cm)	-	3	-	1	2	-	-	2	-	-	-	2	-	293	-	30	-	333
Feature 6 (60-83 cm)	-	-	-	2	-	1	-	-	-	-	-	1	-	296	-	19	-	319
Subtotals	1	5	1	7	6	1	0	8	1	1	1	12	1	1,116	0	83	1	1,245
<b>BACKHOE TRENCH 7</b>																		
Backdirt	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Feature 2 (50 cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Subtotals	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3
<b>BACKHOE TRENCH 8</b>																		
Surface	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
<b>GENERAL COLLECTION</b>																		
Surface	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Totals	2	8	1	7	6	1	1	8	1	1	1	12	1	1,116	1	83	1	1,251



excavation of two coarses of small fractured pieces of burned rocks from this area revealed a slab-lined natural bedrock depression, defined as Feature 6 (Figure 77). The largest of these slabs measured 35x25x5 cm. The excavated portion of Feature 6 measured 100 cm east-west by 60 cm north-south, but the overall size of the feature is estimated to be 150 cm in diameter, since burned slabs extended into the east, west, and north walls of the unit. A total of 136 burned rocks (85 kg) were recovered from the excavated portion of the feature. In contrast with the midden rocks above, the majority ( $n = 75$ , 55.1 percent) of the Feature 6 rocks were 5–15 cm in size. The remainder consist of 38 (27.9 percent) in the <5 cm size range, 20 (14.7 percent) in the 15–25 size range, and 3 (2.2 percent) in the 25–35 cm size range. Notably, 23 burned rocks were intact or unfractured. A flotation sample yielded *Quercus fusiformis* wood (see Appendix E). *Quercus* sp. wood, identified in a charcoal sample collected at 60–70 cm, yielded a conventional radiocarbon age of  $2560 \pm 50$  B.P. (Beta-102143; see Appendix A).

### Discussion

Calibrated dates of A.D. 1270–1300 for the top of the midden and 800–600 B.C. for the internal hearth at the base of the midden indicate that the midden deposit accumulated from Late Archaic times to the Late Prehistoric Toyah phase. Considering these radiocarbon dates, the 40–50 cm of midden deposits accumulated on the bench in Subarea B over a period of some 470–700 years. The dates also show that these features are not contemporaneous with the midden below (in Subarea A). Charcoal, bone, and macrobotanical remains are well preserved within the Analysis Unit 3 cultural deposits.

### Summary and Conclusions

The current investigations focused on the burned rock middens (Features 1 and 2) at site 41CV1269. Although large portions of each of these middens have been vandalized, the test excavations demonstrate that both Subareas A and B contain intact subsurface cultural deposits and features. It is recommended that 41CV1269 be considered eligible for listing in the NRHP.

## 41CV1275

### Site Setting

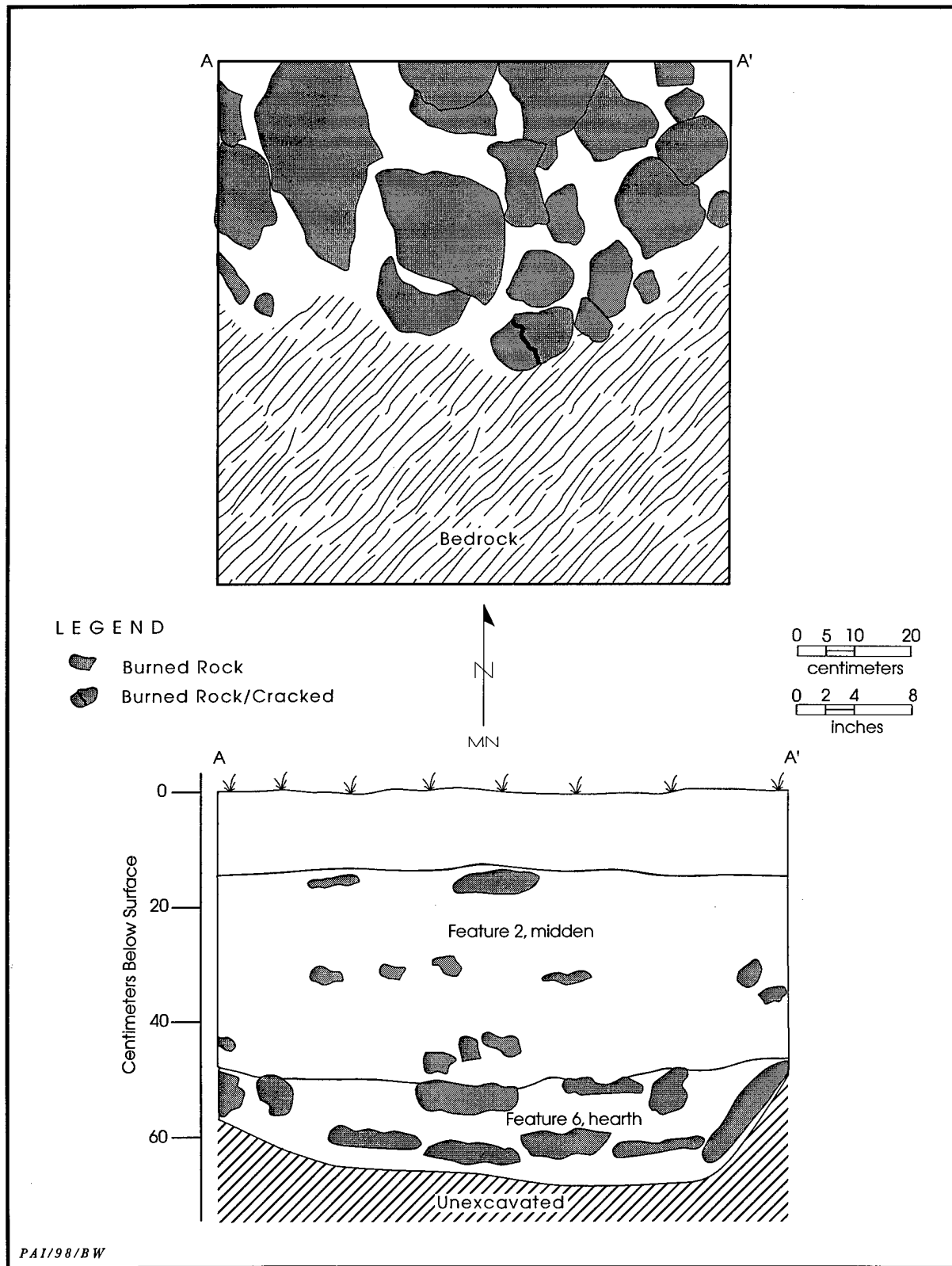
Site 41CV1275 is an extremely large site situated on the north side of House Creek (Figure 78). The site extends north from the creek across the  $T_0$ ,  $T_1$ , and  $T_2$  terraces and a colluvial slope up onto an upland (Killeen) surface. A south-flowing, unnamed tributary of House Creek bisects the central portion of the site, and several tank trails crisscross the area. Dense hardwood and juniper trees are present along House Creek, and scattered stands of junipers are broken by extensive open grasslands across the terraces and upland. Site elevation is 290 m above mean sea level.

### Previous Work

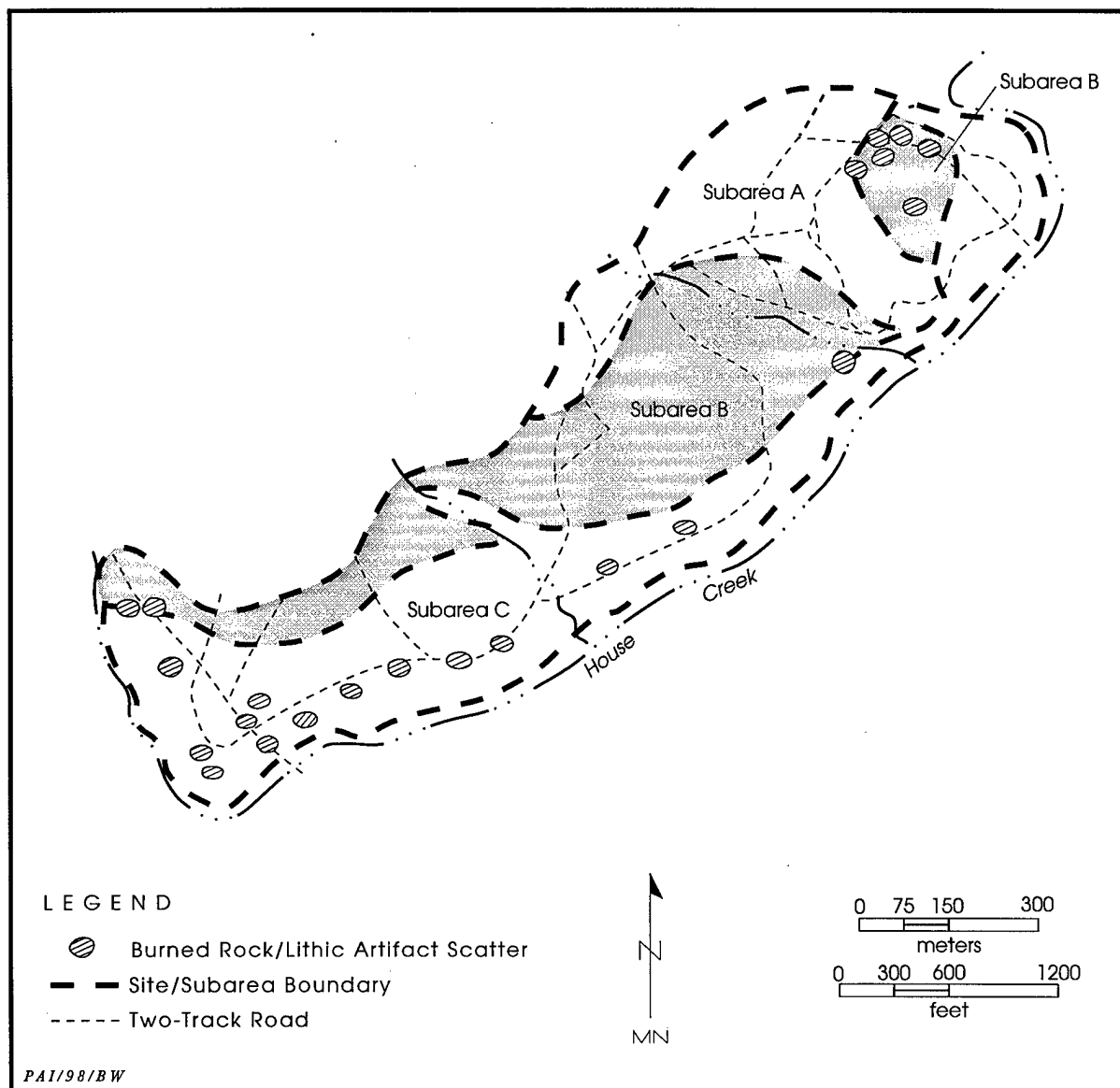
Site 41CV1275 was first recorded on 6–11 June 1986 by Dureka, Mesrobian, Strychalski, Kooren, Mehalchick, Frye, Rotunno, McCabe, and Davis (Texas A&M University) as a burned rock and lithic scatter, with a vandalized burned rock midden/mound noted near the western site boundary. Site dimensions were defined as 1,950x550 m, with a northeast-southwest long axis. Three dart points (Morrill, Castroville, and Angostura) were collected. An estimated 42 percent of the site had been impacted by vandalism, vehicular traffic, and erosion. Just above the northwest margin of 41CV1275, a previously recorded site (41CV78) was noted to be a chert resource area.

On 16 November 1992, Abbott and Turpin (Mariah Associates) revisited and reevaluated the site. Site dimensions were altered to 2,100 m northeast-southwest by 500 m northwest-southeast. Based on differing geomorphic contexts and archeological potentials for intact deposits, the site was divided into Subareas A, B, and C.

Subarea A, defined as the upland surface and erosional valley walls, was noted to be underlain by thin, nodular limestones and clays. A remnant Bt-R profile was observed, but bare limestone regolith was exposed in most places. Debitage was scattered across the surface; a Uvalde dart point was collected and two small (<4 m in diameter) burned rock concentrations (Features 1 and 2) were identified. Due to dissection and deflation, both features lacked contextual integrity. Thus, Subarea A was



**Figure 77.** Plan and profile of Feature 6 in Test Unit 4, 41CV1269.



**Figure 78.** Site map, 41CV1275 (modified from Trierweiler, ed. 1994:A1412).

dominantly erosional and had no potential for buried archeological deposits but did contain utilized chert outcrops.

Subarea B included colluvial toeslopes and a high Pleistocene ( $T_2$ ) alluvial terrace associated with House Creek. This broad area was observed to be erosionally beveled, resulting in a ca.  $12^\circ$  slope. A thin mantle of sheetwash sediments consisted of a sandy to loamy A horizon that was erosionally stripped in places, revealing lithic artifacts and burned rocks concentrated in numerous areas. Two untyped dart points were

collected from the surface. The underlying Jackson alluvium (Nordt 1992) was a highly rubified, stratified, gravelly loam to clay loam up to 2 m thick. The fill contained interdigitated, gravelly, and fine-grained facies indicative of deposition under braided stream conditions. These deposits, overlain by the slopewash A horizon, alternately exhibited a Bt-K-Cox or Bt-Bk-Cox profile.

Subarea C consisted of two distinct alluvial surfaces: a level to gently sloping late Holocene  $T_1$  surface and segments of the floodplain ( $T_0$ ). The  $T_1$  surface comprised the majority of the

subarea, which was underlain by a 75–150-cm-thick deposit of gravelly black clay loam to loam. This fill rested on a bedrock bench that cropped out as a low scarp on the margin of the modern channel and separated the two terrace surfaces. This suggested to the investigators that the deposits represented overbank fines containing interbedded chute-channel gravels. Away from House Creek, the alluvium appeared to override and interfinger with the deposits from the higher  $T_2$  surface. An A-Btss-2R profile was observed in the terrace deposits, which were dissected in places by shallow gullying and sheet erosion. In virtually every location where this stripping occurred, dense amounts of cultural materials were exposed on the surface. Literally dozens of small burned rock concentrations were observed; however, these were not described or assigned feature numbers. A Bulverde dart point was collected from this surface.

The  $T_0$  surface was noted to be narrow and discontinuous, and consisted of up to 2 m of fine-grained, stratified loams and clay loams exhibiting an A-C profile. No cultural materials were observed in these deposits.

Since Subareas B and C had potential for buried cultural deposits, a crew returned to the site in January 1993 and excavated a total of 569 shovel tests. No further work was recommended in Subarea A.

Of 257 shovel tests excavated across Subarea B, only 22 tests (8.6 percent) yielded cultural materials to a maximum depth of 40 cm. Due to the paucity of cultural materials in shovel tests, the lack of demonstrably intact deposits in the upper 40 cm, and the lack of potential for intact cultural deposits below the depth of shovel testing, no further work was recommended for Subarea B.

Of 312 shovel tests excavated in Subarea C, 37 (11.9 percent) yielded cultural materials from 0–40 cm. However, shovel tests in two separate portions of the subarea indicated horizontal and vertical patterning of cultural materials. One area, ca. 60 m north-south and 35 m east-west, was at the southwestern site margin. The second area was in the east-central portion in the subarea. In addition, two other localized “hot spots” where shovel tests produced the greatest numbers of burned rocks were noted. Based on these results, Subarea C appeared to have intact cultural deposits of unknown significance.

Since 41CV1275 was classified as an LRPA,

Abbott and Kleinbach (Mariah Associates) revisited the site on 23 March 1993 to evaluate the potential for Subarea A to address questions of lithic resource procurement and reduction. Chert and impact zones were identified, mapped, and characterized, and samples of unmodified chert were collected. Since Subarea A contained chert resources and the area was not judged to be completely disturbed, a crew returned to the site on 2 April 1993 to conduct quantitative artifact observations along resurvey transects.

Based on the shovel testing and resurvey results, all of Subarea B and ca. one-half of Subarea A were considered insignificant and recommended as ineligible for NRHP listing. The remainder of Subarea A consisted of chert zones thought to be potentially eligible for NRHP nomination due to the presence of lithic assemblages as evidence of lithic procurement behavior. Subarea C was thought to contain potentially intact cultural materials in stratified context, especially in the two “hot spots.” A testing effort of 8–10 m<sup>2</sup> of manually excavated test units was recommended to determine the eligibility of Subarea C (Trierweiler, ed. 1994:A1411–A1419).

### Work Performed

Formal testing of Subarea C of site 41CV1275 was completed on 4 June 1997 (Figure 79). Thirteen backhoe trenches and thirteen 1x1-m test units were excavated; a volume of 9.8 m<sup>3</sup> was manually dug. Backhoe trenches varied considerably in size, depth, and orientation (Table 33). Nine of the 13 trench profiles and a cutbank locality in the west-central portion of the site were described, and soil geomorphology was assessed.

Backhoe Trench 1 was placed at the southwestern margin of the site where previous investigators noted horizontal and vertical patterning of recovered artifacts. Scattered burned rocks were observed in the upper dark horizon from 0–34 cm, and a lens of burned rocks was exposed at 25–35 cm in the west wall profile.

Backhoe Trench 2 was excavated in the west-central portion of Subarea C, adjacent to the area where the initial site recorders observed a burned rock mound or midden. Although the ground surface was hummocky in this area, possibly the result of vandalism, the profile of Backhoe Trench 2 only revealed scattered burned rocks shallowly buried just below the

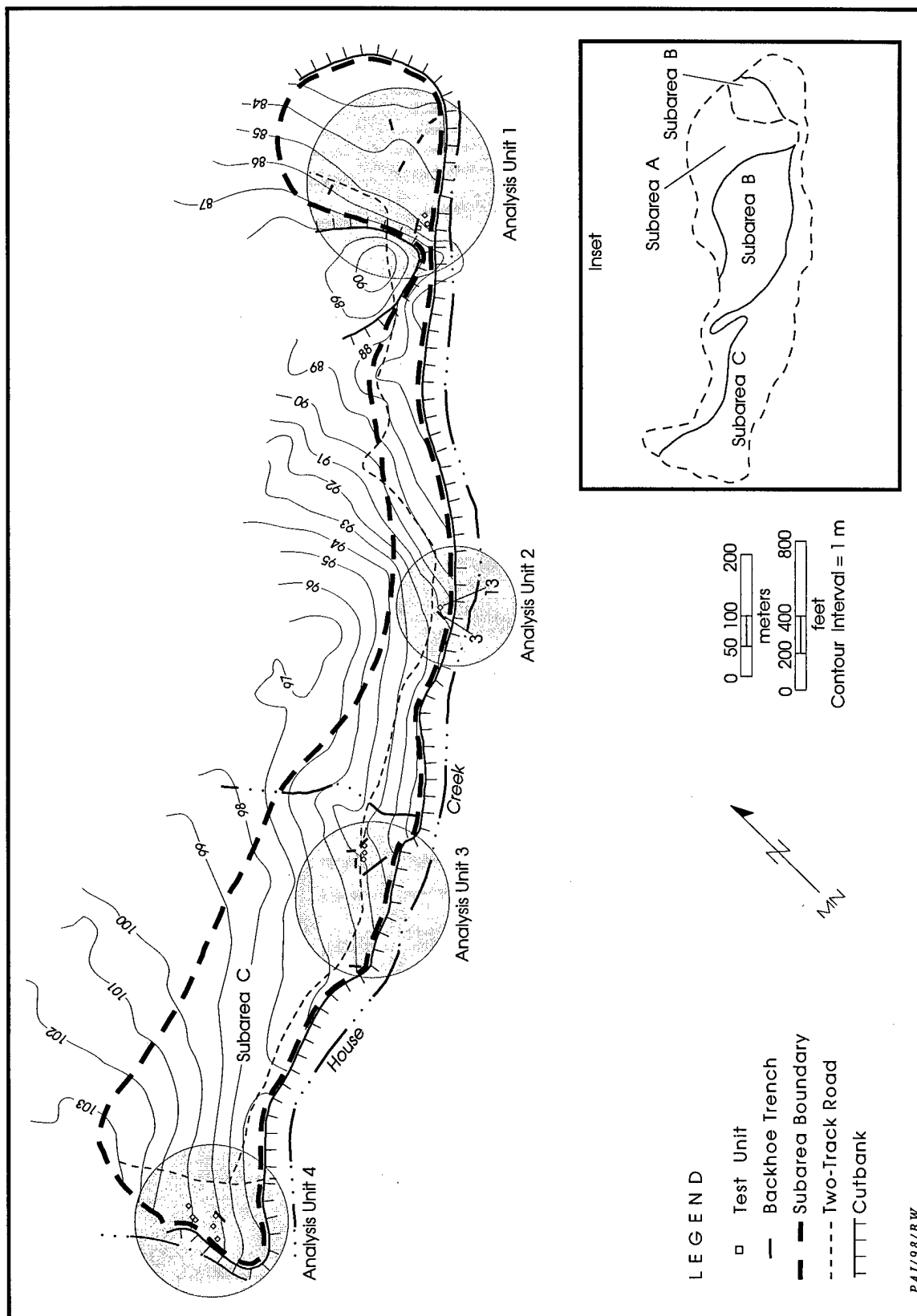


Figure 79. Map of Subarea C, 41CV1275.

**Table 33. Measurement and orientations of backhoe trenches at 41CV1275**

Backhoe Trench	Measurements (L x W x D)	Orientation
1	30x0.8x1.7 m	355°
2	20x0.8x0.7 m	300°
3	13x0.8x1.1 m	350°
4	13x1.5x2.9 m	227°
5	20x0.8x1.9 m	281°
6	14x0.8x3.0 m	252°
7	15x0.8x3.1 m	255°
8	14x0.8x3.3 m	196°
9	14x0.8x3.3 m	250°
10	13x0.8x1.4 m	230°
11	17.5x0.8x1.0 m	310°
12	11x0.8x1.2 m	250°
13	33x0.8x2.15 m	318°

surface within a thin (41 cm) black clay loam A horizon resting on a weathered limestone strath terrace.

Backhoe Trenches 10–13 were excavated east of Backhoe Trench 2 and on the west side of the unnamed tributary, which is one of the “hotspot” areas noted by the previous investigators. No cultural materials were found in Backhoe Trench 10, a few burned rocks were observed in the upper A horizon in Backhoe Trenches 11 and 12, and a burned rock concentration (Feature 5) was recorded in the east wall profile of Backhoe Trench 13.

Backhoe Trench 3 was excavated east of the tributary in the east-central portion of the site, within another area where horizontal and vertical patterning of recovered artifacts was noted by previous investigators. No cultural materials were found in the trench.

The remaining trenches (Backhoe Trenches 4–9) were excavated across the eastern portion of the site. Backhoe Trench 4 was placed adjacent to a “hotspot” noted by the previous investigators; the other trenches were placed randomly across the terrace. No cultural materials were observed in any of these trenches.

In the eastern portion of the site, Test Unit 2 was oriented with and excavated along the south wall of Backhoe Trench 4. Test Units 1 and 7 were placed several meters south of Backhoe Trench 10 near the edge of House Creek.

In the east-central portion of the site, Test Unit 13 was excavated several meters east of

Backhoe Trench 3. In the west-central portion of Subarea C, Test Unit 12 was oriented with and placed along the north end of Backhoe Trench 12. Test Units 9 and 10 were placed between Backhoe Trenches 12 and 13.

At the western margin of the site, Test Unit 5 was oriented with and placed along the west wall of Backhoe Trench 1, over the exposed lens of burned rocks. Test Units 3, 4, 6, 8, and 11 were placed in the vicinity of Backhoe Trench 1. Test Units 4 and 8 were contiguous units. All of the units not placed along a backhoe trench were oriented to magnetic north.

### Definition and Interpretation of Analysis Units

Only Subarea C, which encompasses an area of ca. 2,000 m northeast-southwest by 250 m northwest-southeast, was investigated during the current study. Because the backhoe trenches and test units are clustered into four widely separated areas, four analysis units (Analysis Units 1–4) are defined for the site (Table 34). Each is discussed separately below.

#### Analysis Unit 1

Analysis Unit 1 includes all cultural materials recovered in Test Units 1, 2, and 7 in the eastern end of the site. No cultural materials were recovered in nearby Backhoe Trenches 4–9.

#### Extent and Depth

Test Units 1, 2, and 7 were excavated to 70, 170, and 50 cm, respectively. Cultural artifacts were found at 50–60 cm in Test Unit 1, at 10–40 cm and 50–60 cm in Test Unit 2, and at 0–40 cm in Test Unit 7. All three units occur within an area of approximately 30x30 m (Figure 80).

#### Sediments and Stratigraphy

Upstream from the eastern end of site 41CV1275, House Creek is relatively straight and confined, but the valley widens as it approaches the eastern end of the site and the stream channel begins to meander. In this area, multiple alluvial fills dating from the end of the Pleistocene to the late Holocene are preserved below the surface of the T<sub>1</sub> terrace. Terrace fills were sampled by Backhoe Trenches 4–9; profiles

**Table 34. Summary of analysis units in Subarea C, 41CV1275**

Analysis Unit	Location	Test excavations in analysis unit area	Alluvial unit producing cultural materials
1	East end of Subarea C	Backhoe Trenches 4–9 Test Units 1, 2, and 7	Ford and West Range
2	East-central portion of Subarea C	Backhoe Trench 3 Test Unit 13	West Range
3	West-central portion of Subarea C	Backhoe Trenches 2 and 10–13 Test Units 9, 10, and 12	West Range
4	West end of Subarea C	Backhoe Trench 1 Test Units 3–6, 8, and 11	West Range

are described for each of these trenches.

Backhoe Trench 5 was excavated near the edge of the T<sub>1</sub> terrace and the House Creek channel. It consists of Ford alluvium (0–73 cm) laterally inset to a deposit of upper and lower West Range alluvium (73–147+ cm). The Ford sediments are dark loamy deposits imprinted with a weakly developed A-Bw soil profile. The underlying upper West Range alluvium includes a very dark grayish brown clay loam imprinted with a 59-cm-thick 2Ab soil horizon. A bulk soil sample collected from 100–109 cm yielded a conventional radiocarbon age of 910 ± 60 B.P. (Beta-102145; see Appendix A). Nordt (1992:39, 66) did not observe the upper West Range alluvium in the House Creek valley, but did suggest that isolated buried remnants of it may be present in some sections of the valley. Generally deposited between 2800 and 600 B.P., its presence at 41CV1275 appears to concur with Nordt's (1992) conclusion, as this deposit appears to be a small, fortuitously preserved remnant. Lower West Range basal deposits (132–147+ cm) are comprised of a yellowish brown gravelly clay.

Backhoe Trenches 4, 6, and 8 are also located on the T<sub>1</sub> terrace surface. Three alluvial fills—the lower West Range, Fort Hood, and Georgetown alluvium—were identified. In some instances, the lower West Range sediments lie directly atop the Georgetown alluvium, specifically in those backhoe trenches on the more distal portions of the meander lobe (e.g., Backhoe Trenches 6 and 8). Here, the Fort Hood and the top of the Georgetown alluvium were removed during a period of erosion prior to the deposition of the lower West Range sediments. In Backhoe

Trench 4, the lower West Range alluvium is 136 cm thick and consists of an upper fine-grained deposit and basal clast-supported gravel. The upper fine-grained alluvium is imprinted with an A-Bw soil profile. The A horizon is a dark gray loam, while the Bw horizon is a yellowish brown clay exhibiting a weak coarse prismatic structure breaking to a moderate medium angular blocky structure. Underlying the basal gravel is a 30-cm-thick unit identified as Fort Hood alluvium. The Fort Hood fill exhibits a brown silty clay loam soil (2Ab horizon). The Georgetown alluvium (166–226+ cm) consists of a pale yellow silty clay. It represents the truncated 3Btb soil horizon of the Royalty paleosol (Nordt 1992).

The profile of Backhoe Trench 6 consisted of lower West Range alluvial deposits (0–143 cm) overlying a truncated Georgetown fill (143–281+ cm). The lower West Range alluvium is comprised of interbedded gravelly clay loams and loams representing overbank sediments and chute-channel gravels. An A-Bk-Bw soil profile is imprinted on these deposits. The Georgetown alluvium is capped by truncated Royalty paleosol exhibiting a brown silty clay loam 2Btb profile. A bulk soil sample collected from this paleosol (156–162 cm) yielded a conventional radiocarbon age of 9550 ± 50 B.P. (Beta-102146; see Appendix A). A very pale brown, coarse sandy clay to sandy loam lies below the Royalty paleosol.

The profile of Backhoe Trench 8 is very similar to that of Backhoe Trench 6, revealing lower West Range alluvium (0–198 cm) overlying a truncated Georgetown alluvium (198–302+ cm). The lower West Range fill, which consists of interbedded deposits of overbank sediments and

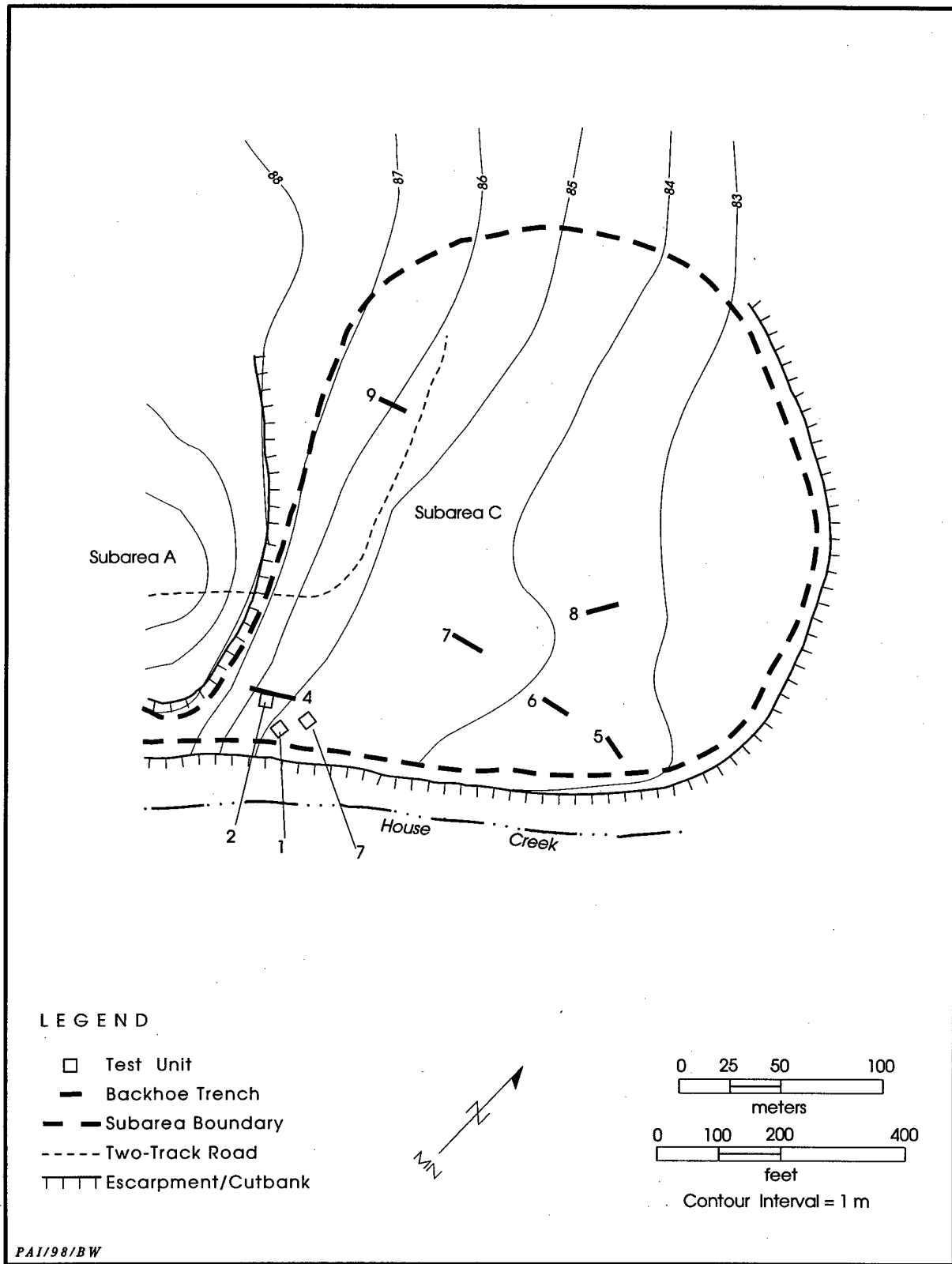


Figure 80. Area of Analysis Unit 1, 41CV1275.



chute-channel gravels, is imprinted with an A-B-Bwk-C soil profile. The Georgetown alluvium is capped by the truncated Royalty paleosol exhibiting a very pale brown silty clay 2Btb horizon. Underlying the paleosol is a very pale brown, very gravelly sandy clay.

Backhoe Trench 9 was excavated close to the interface of the valley wall and the T<sub>1</sub> terrace. Its profile reveals Fort Hood alluvium (0–210 cm) overlying Georgetown alluvium (210–302+ cm). The Fort Hood deposits are dark grayish brown, brown, dark brown, and reddish brown loams and clays. A well-developed A-Bw-Bw2 soil has formed on these deposits. The truncated Royalty paleosol caps the Georgetown fill, which displays a yellow silty clay loam 2Btb horizon. A bulk soil sample collected from the 2Btb horizon (225–230 cm) yielded a conventional radiocarbon age of  $11,170 \pm 50$  B.P. (Beta-102147; see Appendix A). A structureless brownish yellow gravelly sandy clay underlies the Royalty paleosol.

### ***Cultural Materials***

Cultural materials were restricted to the upper 70 cm of deposit. Only 9 out of 29 levels (31 percent) were positive; the total recovery included 15 flakes, 4 burned rocks, and 3 chipped stone tools (an edge-modified flake, a miscellaneous uniface, and a multifunctional tool). No level produced more than 5 cultural items, with the majority containing 1–3 artifacts.

### ***Discussion***

A small amount of lithic artifacts were recovered from the test units defined as Analysis Unit 1. No diagnostic artifacts, dateable organics, or subsistence remains were found. Evidence of disturbed deposits (i.e., military debris) was found to a depth of 10, 20, and 30 cm in Test Units 1, 2, and 7, respectively.

Although some of the trenches revealed sediments of great antiquity (Georgetown alluvium/Royalty paleosol and Fort Hood alluvium), no cultural materials were found within them. Cultural materials were discovered in the overlying younger sediments, but these deposits are seriously disturbed.

### ***Analysis Unit 2***

Analysis Unit 2 consists of cultural materials

found in Test Unit 13, which was excavated to a depth of 50 cm in the east-central portion of Subarea C. No cultural materials were found in nearby Backhoe Trench 3.

### ***Extent and Depth***

Artifacts were found at 0–30 and 40–50 cm in Test Unit 13. The extent of buried cultural deposits in this area is not precisely known, but previous shovel tests indicated that sparse cultural materials are confined to a small area (i.e., less than 30x30 m).

### ***Sediments and Stratigraphy***

Sediments and stratigraphy of Test Unit 13 revealed 50+ cm of dark loamy and clayey fill interpreted as the West Range alluvium. The fill exhibits an A-Bw soil profile. The A horizon (0–30 cm) is a dark brown sandy clay loam, while the Bw horizon is a dark brown clay.

### ***Cultural Materials***

Test Unit 13 produced 11 small burned rocks and 1 flake from 0–30 cm and 1 burned rock and 1 flake from 40–50 cm.

### ***Discussion***

Only a small amount of lithic artifacts were recovered from Analysis Unit 2. No diagnostic artifacts, dateable organics, or subsistence remains were found. No isolable occupations or intact features were discovered.

### ***Analysis Unit 3***

Analysis Unit 3 includes materials recovered in Test Units 9, 10, and 12 excavated west of the unnamed tributary that transects the west-central portion of the site. Scattered burned rocks were observed in Backhoe Trenches 2, 11, and 12; a burned rock feature was observed in Backhoe Trench 13.

### ***Extent and Depth***

All cultural materials were observed and/or collected from the upper 70 cm of deposits in backhoe trenches and test units. Excluding a few burned rocks in Backhoe Trench 2, all of this

cultural evidence occurs within an area of approximately 75x75 m (Figure 81). Test Units 9, 10, and 12 were excavated to 90, 80, and 70 cm, respectively. Cultural materials were recovered from 0–80 cm in Test Unit 9, from 0–70 cm in Test Unit 10, and from 0–10, 20–30, and 40–70 cm in Test Unit 12.

### Sediments and Stratigraphy

The profiles of two backhoe trenches and a section of the House Creek cutbank define the

deposits in Analysis Unit 3. Along this section of House Creek, the  $T_1$  terrace can be divided into an upper  $T_{1a}$  and a lower  $T_{1b}$ . Deposits of the  $T_{1b}$  terrace were examined in the House Creek cutbank profile, while Backhoe Trench 13 cross cut both the upper and lower terrace surfaces. Backhoe Trench 10 sampled the  $T_{1a}$  terrace. All of the profiles examined display multiple alluvial fills resting on a strath terrace. It is also possible that the more recent lower West Range fills may contain a mix of colluvial sediments given the eroded nature of the  $T_2$  terrace and uplands to

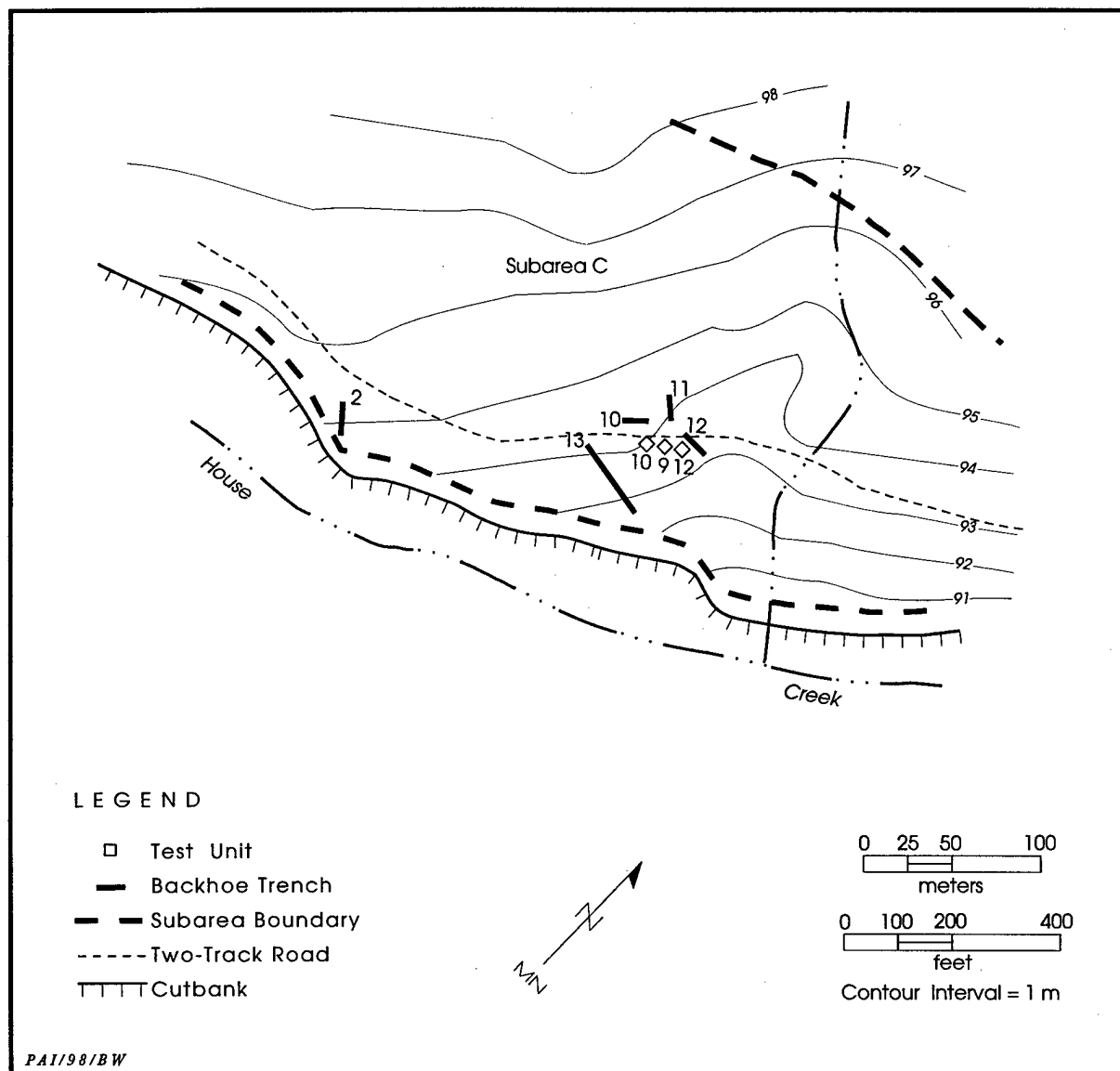


Figure 81. Area of Analysis Unit 3, 41CV1275.

the north. However, even though shallow gullies and channels are present across the terrace surface, stratigraphically discrete colluvial deposits could not be discerned in the observed profiles.

The cutbank locality along House Creek consisted of deposits of Ford and lower West Range alluvium. The upper 151 cm of the profile consists of a very dark gray to very dark grayish brown gravelly silty clay loam. It could not be determined whether this is a drape of Ford or West Range alluvium. The deposit exhibits an A-Bwk soil profile with an abrupt smooth lower boundary. Underlying this deposit is dark gray gravelly silty clay loam (151–166 cm) identified as the lower West Range alluvium. The dark gravelly deposit is imprinted with a 2Ab horizon. A bulk soil sample collected from the buried soil yielded a conventional radiocarbon age of  $2060 \pm 80$  B.P. (Beta-102148; see Appendix A). All of these sediments rest on a strath terrace of Glen Rose limestone, the top of which lies 170 cm above the House Creek channel.

Backhoe Trench 13 exposed portions of the  $T_{1a}$  and  $T_{1b}$  terraces. The fill in the south end of the trench represents the  $T_{1b}$  terrace and is similar to that documented in the House Creek cutbank (i.e., a drape of Ford/West Range alluvium resting on a strath terrace). The northern end of the trench exposed  $T_{1a}$  sediments and revealed a drape of lower West Range alluvium (0–56 cm) overlying a Georgetown alluvium (56–206 cm). The Georgetown alluvium rests on a strath terrace of Glen Rose limestone. The lower West Range fill consists of a very dark gray clay loam and dark brown silty clay loam. These fine-grained sediments represent an overbank facies that laterally grades to the gravelly channel fill facies observed and radiocarbon dated along the House Creek cutbank. This late Holocene fill exhibits an A-Bw soil profile. A burned rock feature was observed in the profile and a bulk soil sample was collected from below the feature at 45–50 cm. This sample yielded a conventional radiocarbon age of  $1980 \pm 40$  B.P. (Beta-106151; see Appendix A). In addition, a radiocarbon assay was obtained on a snail shell (*Rabdotus* sp.) from 63 cm below surface. The sample yielded a conventional radiocarbon age of  $2420 \pm 40$  B.P. (Beta-106967; see Appendix A). Its contact with the underlying Georgetown alluvium is abrupt and wavy. The Georgetown alluvium consists of a 150-cm-thick, yellowish brown muddy gravel.

The 140-cm-thick profile of Backhoe Trench 10

consists of lower West Range alluvium (0–127 cm) overlying gravelly Georgetown alluvium (127–140+ cm). The lower West Range deposits consist of dark loamy and clayey sediments that exhibit an A-Bw-Cox soil profile. The underlying Georgetown alluvium is a structureless very pale brown, very gravelly silty clay. Although the radiocarbon assays indicate an upper West Range age for the late Holocene alluvial drape of the  $T_{1a}$  terrace and the buried deposits of the  $T_{1b}$  terrace, the sedimentological character of these deposits appears to suggest otherwise. These gravelly deposits are more typical of the lower West Range alluvium. Nordt (1992:39) suggested, and it is clearly supported here based on the radiocarbon ages, that the deposition of the gravelly, braided lower West Range was ongoing as late as 2000 B.P. on House Creek. Temporal overlap between the upper and lower West Range members within the stream valleys of Fort Hood is common; Nordt (1992:66) believes this is related to drainage basin size. Smaller basins, like House Creek, consist of headwater areas and steep gradients that result in flashy intermittent discharges. Such settings may result in much later ages for the terminus of lower West Range deposition in the smaller stream valleys than in larger valleys, like Cowhouse Creek. Since the location of site 41CV1275 is near the periphery of the basin, it is not surprising to find more-recent ages on the lower West Range alluvium. The provenience of these current dates, overlying the strath terrace at the recorded cutbank locality and within basal lower West Range deposits (Backhoe Trench 13), reveal the time-transgressive nature of the lower West Range alluvium, when compared to a 3,700-year-old radiocarbon age on lower West Range alluvium on the south side of the valley (see site 41CV1286).

The underlying Georgetown alluvium observed in Backhoe Trenches 10 and 13 is also uncharacteristically gravelly and poorly sorted, a probable product of the locality's position in the House Creek drainage basin. During the period of Georgetown alluviation, House Creek was unable to effectively sort materials until it reached the eastern end of the site where the stream was less confined, channel gradient decreased, and the stream started to meander.

### Cultural Materials

Cultural materials recovered include 59

flakes, 52 (6.5 kg) burned rocks, 1 core, 3 chipped stone tools, and 4 dart points (Table 35). The 3 chipped stone tools include an end scraper, a miscellaneous uniface, and an edge-modified flake. The four dart points include 2 Hoxie, 1 Golondrina, and 1 Axtell. One of the Hoxie points was found on the surface of the tank trail immediately upslope from Backhoe Trench 13. The Axtell was found at 10–20 cm in Test Unit 9.

The other Hoxie and the Golondrina were found at 60–70 cm in Test Unit 9.

### Cultural Features

Feature 5, a burned rock concentration, consisted of nine burned rocks exposed in a linear pattern along a 130-cm section of the east wall of Backhoe Trench 13 at 35–50 cm below

Table 35. Summary of cultural materials from 41CV1275, Analysis Unit 3

Provenience	Dart Points	End Scraper	Miscellaneous Uniface	Edge-modified Flake	Core	Unmodified Debitage	Totals
<b>TEST UNIT 9</b>							
Level 1 (0–10 cm)	–	–	–	–	–	3	3
Level 2 (10–20 cm)	1	–	–	–	–	1	2
Level 3 (20–30 cm)	–	–	–	–	–	2	2
Level 4 (30–40 cm)	–	–	–	–	–	1	1
Level 5 (40–50 cm)	–	–	–	–	–	4	4
Level 6 (50–60 cm)	–	1	–	–	–	3	4
Level 7 (60–70 cm)	2	–	–	–	–	4	6
Level 8 (70–80 cm)	–	–	–	–	–	3	3
Level 9 (80–90 cm)	–	–	–	–	–	–	0
Subtotals	3	1	0	0	0	21	25
<b>TEST UNIT 10</b>							
Level 1 (0–10 cm)	–	–	–	1	–	1	2
Level 2 (10–20 cm)	–	–	–	–	–	6	6
Level 3 (20–30 cm)	–	–	–	–	–	6	6
Level 4 (30–40 cm)	–	–	–	–	–	6	6
Level 5 (40–50 cm)	–	–	–	–	–	2	2
Level 6 (50–60 cm)	–	–	–	–	–	4	4
Level 7 (60–70 cm)	–	–	–	–	1	1	2
Level 8 (70–80 cm)	–	–	–	–	–	–	0
Subtotals	0	0	0	1	1	26	28
<b>TEST UNIT 12</b>							
Level 1 (0–10 cm)	–	–	–	–	–	2	2
Level 2 (10–20 cm)	–	–	–	–	–	–	0
Level 3 (20–30 cm)	–	–	–	–	–	1	1
Level 4 (30–40 cm)	–	–	–	–	–	–	0
Level 5 (40–50 cm)	–	–	–	–	–	5	5
Level 6 (50–60 cm)	–	–	1	–	–	2	3
Level 7 (60–70 cm)	–	–	–	–	–	2	2
Subtotals	0	0	1	0	0	12	13
<b>GENERAL COLLECTION</b>							
Surface	1	0	0	0	0	0	1
Totals	4	1	1	1	1	59	67

ground surface. A bulk soil sample from the base of the feature at 45–50 cm yielded a conventional radiocarbon age of  $1980 \pm 40$  B.P. A snail shell recovered from the same soil horizon at 63 cm on the western wall of the trench yielded a conventional radiocarbon age of  $2420 \pm 40$  B.P.

### **Discussion**

Because Analysis Unit 3 includes late Paleoindian to Early Archaic dart points in buried contexts, special attention was given to interpreting the age of these deposits. Although the shallow alluvial deposits containing this cultural evidence were initially interpreted as representing West Range alluvium, the presence of old dart points brought up the possibility that the deposits are actually Fort Hood alluvium with its characteristic attributes completely masked through pedogenic alteration. The soil humate sample and snail shell from Backhoe Trench 13 were specifically collected to address this problem through radiocarbon assay. These samples yielded calibrated dates (1-sigma range) of 5 B.C.–A.D. 75 and 525–405 B.C., respectively (see Appendix A). This evidence indicated that these deposits are indeed West Range alluvium of Late Archaic age.

The discrepancy between the inferred age of the deposits and the presumed age of the Hoxie and Golondrina points was given careful consideration. There is no particular reason to believe that the radiocarbon dates are not valid, and it is assumed that they are an approximate, albeit gross, indication of the true age of these deposits.<sup>2</sup> With this assumption in mind, there are three plausible explanations for the discrepancy. First, the Hoxie and Golondrina points are misidentified and are actually later points in their proper stratigraphic context. This explanation is not satisfactory, and the identifications of the points seem to be valid. Another possible explanation is that the Hoxie and Golondrina

points were deposited in Fort Hood alluvium but that these old sediments are severely mixed with overlying West Range alluvium and that the two alluvial units are virtually indistinguishable. This interpretation is not entirely satisfactory because none of the alluvial deposits in question exhibit sedimentological attributes characteristic of Fort Hood alluvium as defined by Nordt (1992). The third and preferred explanation is that the old artifacts were redeposited in the younger alluvial sediments by colluvial slope-wash coming off of the eroded T<sub>2</sub> terrace and uplands immediately to the north. This interpretation is the most reasonable given the evidence at hand and the fact that the sediments in question are interpreted as lower West Range alluvium. Further evidence supporting this interpretation is seen in Analysis Unit 4 (discussed below), where similar lower West Range deposits contain Middle and Late Archaic dart points in a mixed alluvial/colluvial context. In any case, the context of the cultural materials in these sediments is questionable at best, and Analysis Unit 3 has little or no viable research potential.

### **Analysis Unit 4**

Analysis Unit 4 includes all cultural materials observed in Backhoe Trench 1 and recovered from Test Units 3–6, 8, and 11. This analysis unit is located in the western end of the site (Figure 82).

### **Extent and Depth**

Cultural evidence associated with Analysis Unit 4 is located within an area of approximately 75x50 m, but the precise extent of buried deposits is unknown. Test Units 3, 5, and 6 were excavated to 50 cm, Test Unit 4 was excavated to 70 cm, Test Unit 8 was excavated to 90 cm, and Test Unit 11 was excavated to 80 cm. With the exception of the last level (60–70 cm) in Test Unit 4, cultural materials were found in each level of each test unit.

### **Sediments and Stratigraphy**

The sediments and stratigraphy of Analysis Unit 4 were examined in Backhoe Trench 1. The sediments are interpreted as a mix of lower West Range alluvium and colluvium, although discrete

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<sup>2</sup>An A/I ratio of 0.175 on the dated snail shell suggests that it may be 7,000–8,000 years old (a second A/I ratio of 0.165 was obtained for an undated snail shell from the same stratum). Since the AMS radiocarbon age is considerably younger than the inferred age based on the A/I ratio, it was concluded that the A/I ratio is probably too high because the snail shell was heated (see Appendix A).

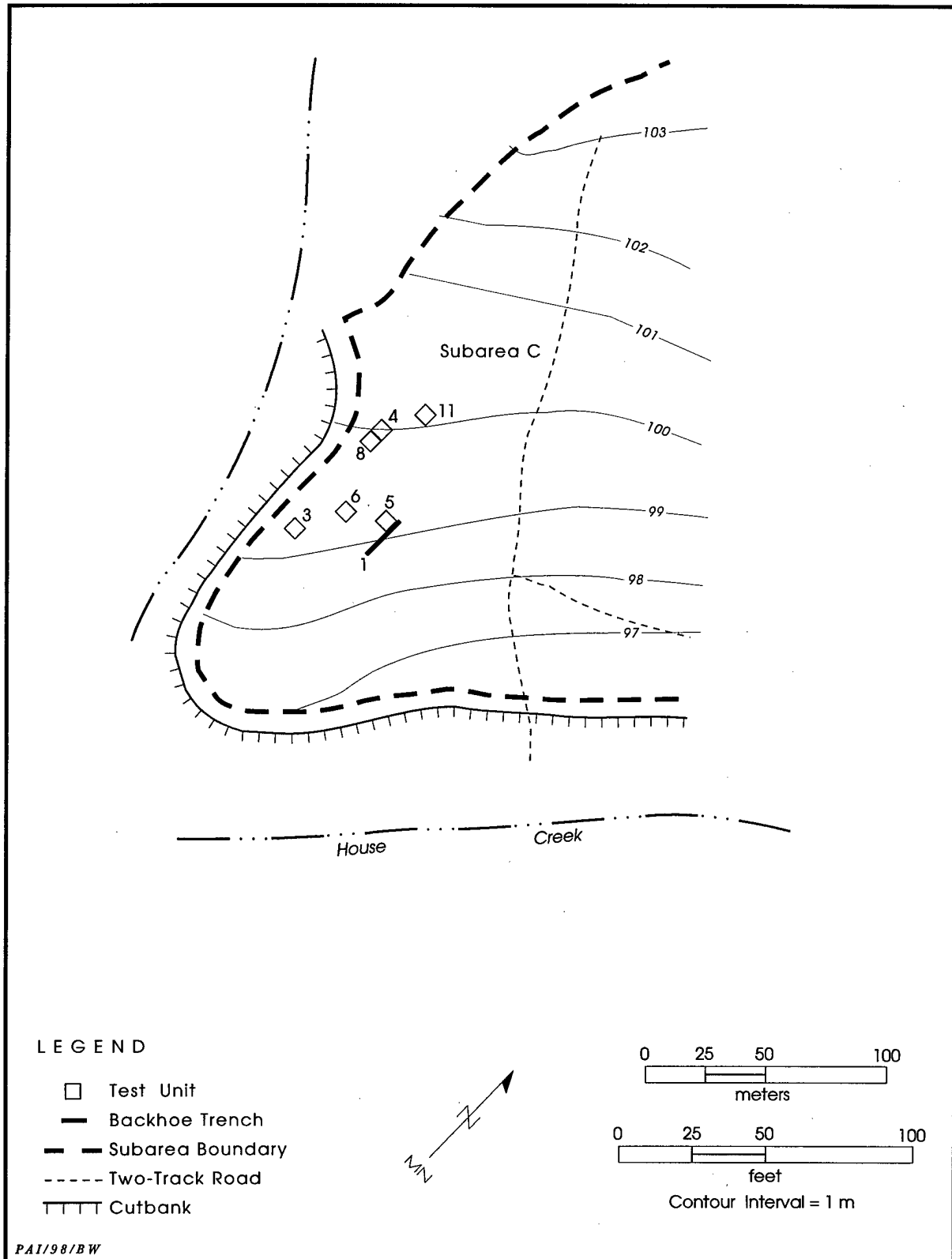


Figure 82. Area of Analysis Unit 4, 41CV1275.

depositional units cannot be discerned. The 160-cm-thick profile of Backhoe Trench 1 revealed three zones. Zone 1 is a 34-cm-thick very dark gray clay loam designated an A horizon. It overlies a 67-cm-thick dark grayish brown gravelly clay loam imprinted with a weak prismatic structure breaking to a blocky-structured Bw horizon. Zone 3 (101–160+ cm) is a brown gravelly silty clay loam C horizon.

### ***Cultural Materials***

Cultural artifacts recovered from Analysis Unit 4 include 2,219 flakes, 572 (127 kg) burned rocks, 72 chipped stone tools, and 11 dart points (Table 36). Approximately 50 percent of all the lithic artifacts were contained in contiguous Test Units 4 and 8. No subsistence or organic remains were found.

### ***Cultural Features***

Feature 3 is a burned rock concentration encountered at 42–54 cm in Test Units 4 and 8. Although the feature extended slightly into Test Unit 4, it was confined primarily to the northern half of Test Unit 8. Because an unknown amount of the feature extends into the west walls of both of the test units, its complete size was not estimated; its maximum excavated dimensions are 83 cm east-west by 60 cm north-south. The feature was composed of one to two layers of 48 burned rocks (13.5 kg). Most of the rocks were horizontally laid, but a few were lying at angles. Approximately one-half of the rocks were tabular pieces, averaging 9x6x2 cm in size. The remainder ranged from small angular fragments to fist-sized and larger cobbles (up to 19x11x9 cm). No cultural materials or organic remains were recovered from the feature fill; however, two flakes were recovered directly beneath the feature.

Feature 4 is another burned rock concentration encountered at 20–38 cm in Test Unit 5. Covering the entire unit, this feature consisted of two to three layers of burned rocks ( $n = 78$ , 61 kg). The majority of burned rocks from 20–30 cm were fist-sized and smaller angular pieces; at least half of the rocks from 30–38 cm were large tabular pieces and slabs (up to 26x20x3 cm). Although many of these larger rocks were lying at angles, no patterning was apparent. The feature matrix yielded 338 flakes, 1 miscellaneous

biface, and 1 edge-modified flake. Because burned rocks were visible in all three walls of Test Unit 5, the maximum size of the feature was not estimated.

### ***Discussion***

All of the deposits containing artifacts are interpreted as a mixture of West Range alluvium and colluvium, the latter having been derived from the T<sub>2</sub> terrace and upland to the north of the Analysis Unit 4 area. Diagnostic artifacts recovered from these deposits include 11 dart points, most of which are identified as Middle or Late Archaic styles (Table 37). Seemingly out of stratigraphic sequence is the occurrence of the Bulverde (Late Archaic) two levels below the two Travis points (Middle Archaic). Although it is possible that the Travis points were recycled by later peoples, the colluvial nature of the sediments suggests that redeposition of older artifacts and/or mixing of deposits is more likely.

### ***Summary and Conclusions***

All of the 1996 investigations at 41CV1275, a 2-km-long site along House Creek, were done in Subarea C. Four separate areas where cultural materials were encountered during testing are defined as Analysis Units 1–4 (from east to west). All of these analysis units are on the T<sub>1</sub> terrace, but they are widely separated in space (i.e., 300+ m apart from each other). All cultural materials were observed or recovered from sediments interpreted as Ford or West Range alluvium. Older alluvial deposits (i.e., Fort Hood and Georgetown alluvium) were encountered, but no cultural materials were observed.

Burned rock features, scattered burned rocks, and/or lithic artifacts are associated with each analysis unit, but the density of observed and/or collected cultural materials varies considerably. Cultural materials in Analysis Units 1 and 2 are exceedingly sparse. Cultural materials in Analysis Units 3 and 4 were found in dubious alluvial/colluvial contexts and lack archeological integrity. All of the analysis units are considered to have a low archeological research potential. It is recommended that Subarea C of 41CV1275 be considered not eligible for listing in the NRHP.

Table 36. Summary of cultural materials from 41CV1275, Analysis Unit 4

Provenience	Dart Points	Early/Middle-stage Bifaces	Late-stage/Finished Bifaces	Miscellaneous Bifaces	Miscellaneous Unifaces	Spokeshave	Graver/Burin	Core Tools	Multifunctional Tools	Edge-modified Flakes	Cores	Unmodified Debitage	Totals
<b>TEST UNIT 3</b>													
Level 1 (0-10 cm)	-	-	-	-	1	-	-	-	-	-	-	1	2
Level 2 (10-20 cm)	-	-	-	-	1	-	-	-	-	3	-	36	40
Level 3 (20-30 cm)	1	-	-	-	-	-	-	-	-	4	-	79	84
Level 4 (30-40 cm)	-	-	-	-	-	-	-	-	-	-	-	4	4
Level 5 (40-50 cm)	-	-	-	-	-	-	-	-	-	-	-	1	1
Subtotals	1	0	0	0	2	0	0	0	0	7	0	121	131
<b>TEST UNIT 4</b>													
Level 1 (0-10 cm)	-	-	-	-	1	-	-	-	-	3	-	67	71
Level 2 (10-20 cm)	-	-	1	1	1	-	-	1	-	3	-	160	167
Level 3 (20-30 cm)	-	-	-	-	1	-	-	-	-	3	-	124	128
Level 4 (30-40 cm)	3	-	-	-	-	-	-	-	-	-	-	52	55
Level 5 (40-50 cm)	-	-	2	-	-	-	-	-	1	-	-	30	33
Level 6 (50-60 cm)	1	-	-	-	1	-	-	-	-	-	-	10	12
Level 7 (60-70 cm)	-	-	-	-	-	-	-	-	-	-	-	5	5
Subtotals	4	0	3	1	4	0	0	1	1	9	0	448	471
<b>TEST UNIT 5</b>													
Level 1 (0-10 cm)	-	-	-	-	-	-	-	-	-	-	-	63	63
Level 2 (10-20 cm)	-	-	-	-	-	-	-	-	-	1	-	159	160
Feature 4 (20-38 cm)	-	-	-	1	-	-	-	-	-	1	-	338	340
Level 4 (38-40 cm)	-	-	-	-	-	-	-	-	-	-	-	-	0
Level 5 (40-50 cm)	-	-	-	-	-	-	-	-	-	-	-	4	4
Subtotals	0	0	0	1	0	0	0	0	0	2	0	564	567
<b>TEST UNIT 6</b>													
Level 1 (0-10 cm)	-	-	-	-	-	-	-	1	1	-	-	18	20
Level 2 (10-20 cm)	1	-	-	-	-	-	-	-	-	-	-	26	27
Level 3 (20-30 cm)	-	-	-	1	1	-	-	-	-	1	-	79	82
Level 4 (30-40 cm)	-	1	2	-	-	-	-	-	-	-	-	56	59
Level 5 (40-50 cm)	-	-	-	-	-	-	-	-	-	-	-	12	12
Subtotals	1	1	2	1	1	0	0	1	1	1	0	191	200
<b>TEST UNIT 8</b>													
Level 1 (0-10 cm)	2	-	-	-	-	-	-	-	2	-	-	72	76
Level 2 (10-20 cm)	-	1	1	-	2	-	-	-	-	-	-	81	85
Level 3 (20-30 cm)	-	-	1	2	-	1	-	-	-	1	-	193	198
Level 4 (30-40 cm)	1	-	1	-	1	-	-	-	1	1	-	84	89
Level 5 (40-50 cm)	-	-	1	-	1	-	-	-	-	1	-	42	45
Level 6 (50-60 cm)	1	-	-	-	-	-	-	-	-	2	1	44	48
Level 7 (60-70 cm)	1	-	-	-	-	-	-	-	-	1	-	31	33
Level 8 (70-80 cm)	-	-	-	-	-	-	-	-	-	-	-	12	12
Level 9 (80-90 cm)	-	-	-	-	-	-	-	-	-	-	-	-	0
Subtotals	5	1	4	2	4	1	0	0	3	6	1	559	586
<b>TEST UNITS 4 AND 8</b>													
51-60 cm below Feature 3	0	0	0	0	0	0	0	0	0	0	0	2	2
<b>TEST UNIT 11</b>													
Level 1 (0-10 cm)	-	-	-	-	-	-	-	-	-	-	1	24	25
Level 2 (10-20 cm)	-	-	1	-	1	-	-	-	-	-	-	47	49



Table 36, continued

Provenience	Dart Points	Early/Middle-stage Bifaces	Late-stage/Finished Bifaces	Miscellaneous Bifaces	Miscellaneous Unifaces	Spokeshave	Graver/Burin	Core Tools	Multifunctional Tools	Edge-modified Flakes	Cores	Unmodified Debitage	Totals
TEST UNIT 11, continued													
Level 3 (20–30 cm)	–	–	–	–	–	–	–	–	–	–	–	80	80
Level 4 (30–40 cm)	–	–	1	–	–	–	–	–	–	3	–	50	54
Level 5 (40–50 cm)	–	–	–	–	–	–	–	–	–	1	–	43	44
Level 6 (50–60 cm)	–	–	–	–	–	–	–	–	–	1	–	33	34
Level 7 (60–70 cm)	–	–	–	–	1	–	1	–	–	–	–	38	40
Level 8 (70–80 cm)	–	–	–	–	–	–	–	–	–	–	–	19	19
Subtotals	0	0	2	0	2	0	1	0	0	5	1	334	345
Totals	11	2	11	5	13	1	1	2	5	30	2	2,219	2,302

Table 37. Dart points from 41CV1275, Analysis Unit 4

Test Unit, Level	Dart points recovered
Test Unit 3, Level 3	1 untypeable
Test Unit 4, Level 4	2 Travis, 1 untyped
Test Unit 4, Level 6	1 Bulverde
Test Unit 6, Level 2	1 Ensor
Test Unit 8, Level 1	2 untypeable
Test Unit 8, Level 4	1 Godley
Test Unit 8, Level 6	1 untyped Group 1
Test Unit 8, Level 7	1 untypeable

## 41CV1282

## Site Setting

Site 41CV1282 is situated on both sides of an unnamed tributary of House Creek (Figure 83). Approximately the western one-third of the site is located on an upland slope, with the remainder situated within the tributary valley. Vegetation consists of scattered juniper trees on the slope, dense hardwood trees along the tributary, and open grassy areas across much of the terrace. Numerous military trails traverse the site, and a tank hulldown with a large associated dirt berm is present at the north-central site margin. Site elevation is 260 m above mean sea level.

## Previous Work

The site was recorded on 30 May 1986 by

Frye and Rodriguez (Texas A&M University) as a series of localized burned rock and lithic scatters. The site measured 425x190 m with a northwest-southeast long axis. An estimated 70 percent of the site was impacted by erosion and military traffic.

The site was revisited on 29 December 1992 by Mehalchick and Frederick (Mariah Associates). Site dimensions were reduced to 320 m northwest-southeast by 150 m northeast-southwest based on the exposure of cultural materials. The site was divided into two subareas based on differing geomorphic surfaces and the potentials for intact cultural deposits. Subarea A encompassed the terraces (T<sub>0</sub> and T<sub>1</sub>) along the tributary valley, whereas Subarea B was defined as the upland slope.

Subarea B was mantled by a discontinuous A-R soil, with limestone exposed across 40 percent of the surface area. Scattered burned rocks and debitage were noted. Two burned rock concentrations (Features 1 and 2) were exposed in road cuts and were severely impacted. Due to the thin nature of the deposits and extensive sheet erosion, the potential for intact cultural remains was considered negligible. No further work was recommended for Subarea B.

Within Subarea A, the modern floodplain (T<sub>0</sub>) was 1.5 m above the stream channel, while the T<sub>1</sub> formed a flat to gently streamward sloping surface 2–3 m above the channel. Multiple alluvial fills were identified in Subarea A. A stratified, fine-grained alluvium comprised all

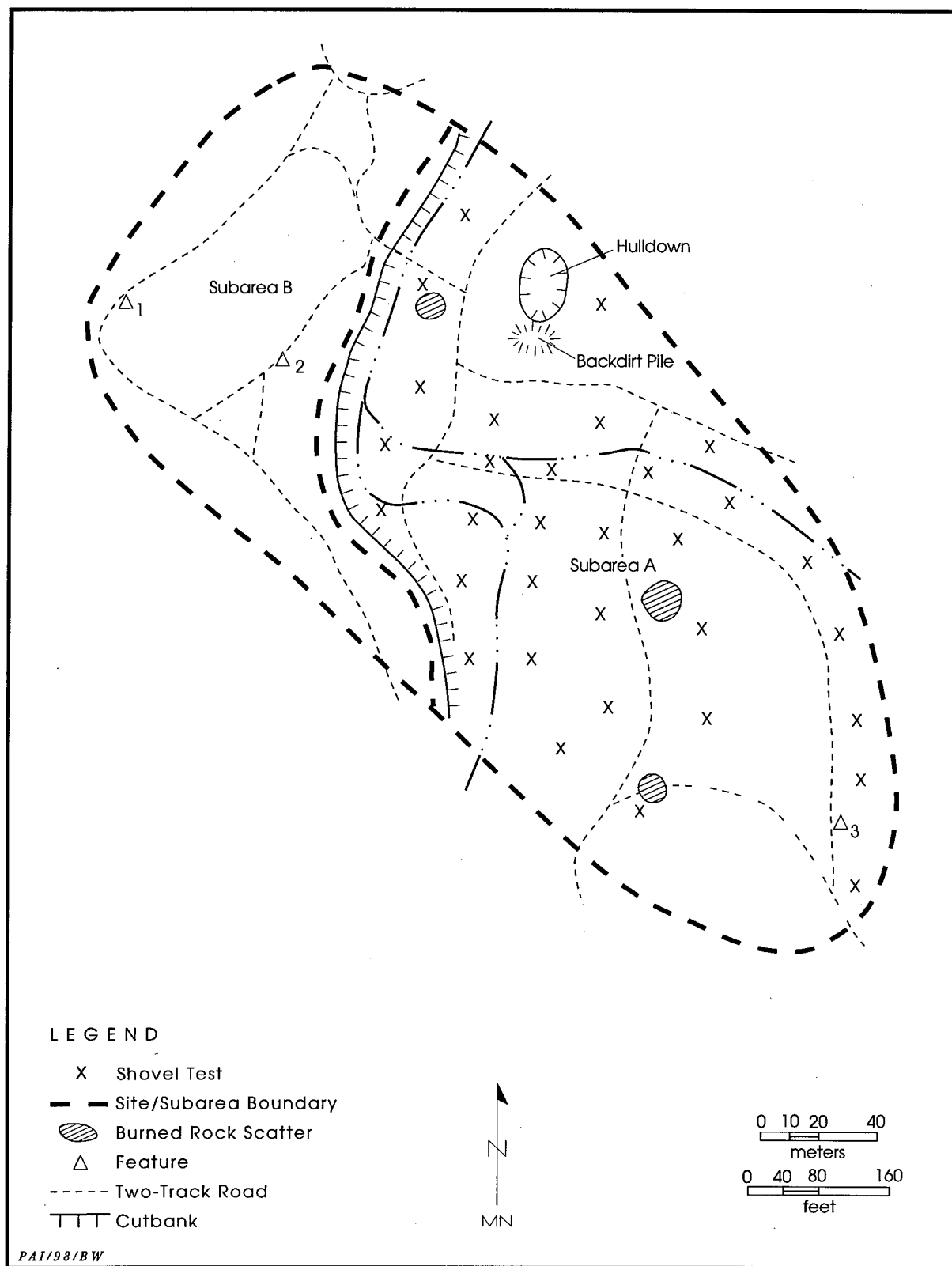


Figure 83. Site map, 41CV1282 (modified from Trierweiler, ed. 1994:A1422).

of the sediment below the floodplain surface, which also draped the leading edge of the higher surface. The T<sub>1</sub> surface was principally underlain by two fills which were interpreted as the upper and lower West Range units (Nordt 1992). The younger fill was composed of massive, fine, dark alluvium, within which an A-Bw-C soil had formed. This unit was described as being inset into a more gravelly fill with a similar soil profile that ranged in thickness from 50 to 200 cm. Burned rock scatters and a few flakes were noted across Subarea A. Located at the southeast margin of the subarea, one burned rock concentration (Feature 3) measured 1.5 m in diameter. Because Subarea A had the potential to contain buried cultural deposits, shovel testing was recommended.

On 14 January 1993, a crew excavated 32 shovel tests in Subarea A. Excavated to 40 cm or less, all of the shovel tests were culturally sterile. Despite the absence of artifacts in the upper 40 cm of deposit, Subarea A had the potential to contain buried cultural deposits of unknown significance below the limits of testing. The recommended testing effort included four backhoe trenches and 3–6 m<sup>2</sup> of manually excavated test units to determine NRHP eligibility (Trierweiler, ed. 1994:A1421–A1423).

### **Work Performed**

On 4 October 1996, formal testing of Subarea A at site 41CV1282 was completed (Figure 84). Site size was expanded slightly to 350 m southeast-northwest by 170 m northeast-southwest, but no evidence of Feature 3, a previously recorded burned rock concentration, remained. It appears that tracked vehicles and subsequent erosion have destroyed this feature. The test excavations included four backhoe trenches (Backhoe Trenches 1–4) and six 1x1-m test units (Test Units 1–6). A total of 3.5 m<sup>2</sup> was manually excavated.

Placed just north of the hullo down at the north-central site margin, Backhoe Trench 1 had maximum dimensions of 8.0x0.8x1.7 m and was oriented to 280°. Backhoe Trench 2 was placed approximately 12 m south of the tributary and 20 m east of the upland surface. Oriented to 230°, this trench measured 10.0x0.8x1.8 m. Backhoe Trenches 1 and 2 were excavated to basal gravels. Backhoe Trench 3 (12.0x0.8x1.5 m) was located 45 m southeast of Backhoe Trench 2. The

trench was oriented to magnetic north and excavated to bedrock. Backhoe Trench 4 was situated south of the tributary near the central portion of Subarea A. The trench was oriented to 308°, measured 15.0x0.8x2.2 m, and encountered the water table. No cultural materials were observed in any of the four backhoe trenches.

Six test units were excavated to dense gravels in various locations across the site. Test Unit 1 was placed along the south wall of Backhoe Trench 4 and excavated to 150 cm. Test Unit 2 was located approximately 10 m southwest of Test Unit 1 and excavated to 60 cm. Since the upper 40 cm of deposits in Test Units 1 and 2 were of recent origin and contained modern trash, this matrix was removed and not screened. In both of these test units, excavation began with Level 5 (40–50 cm). Excavated to 80 cm, Test Unit 3 was situated 20 m east of the tributary and 40 m west of the hullo down. Test Units 4 and 5 were situated over a burned rock concentration exposed in a clearing in the southern portion of Subarea A. The test units were contiguous and excavated to 20 cm. Test Unit 6 was located near the southern edge of Subarea A. The unit was placed over a few scattered burned rocks and excavated to 20 cm.

### **Site Extent and Depth**

The terrace comprising Subarea A is delimited by the upland surface on the west, but continues an unknown distance in all other directions. Based on previous observations and the results of testing, the horizontal extent of Subarea A is 350x170 m. Sparse cultural materials and the questionable integrity of Feature 4 (hearth) from 0–19 cm indicate that no intact cultural deposits are present.

### **Sediments and Stratigraphy**

The sediments and stratigraphy of site 41CV1282 consist of late Holocene Ford and West Range alluvium. The 161-cm-thick profile of Backhoe Trench 1 consists of dark loamy alluvium overlying a clast-supported gravel bed (73–89 cm) and very pale brown clay (89–161+ cm). It is believed that the upper dark loamy alluvium represents a thin drape of Ford alluvium (0–34 cm) and upper West Range deposits (34–73 cm), while the fluvial gravel bed and basal clay represent lower West Range alluvium. The profile

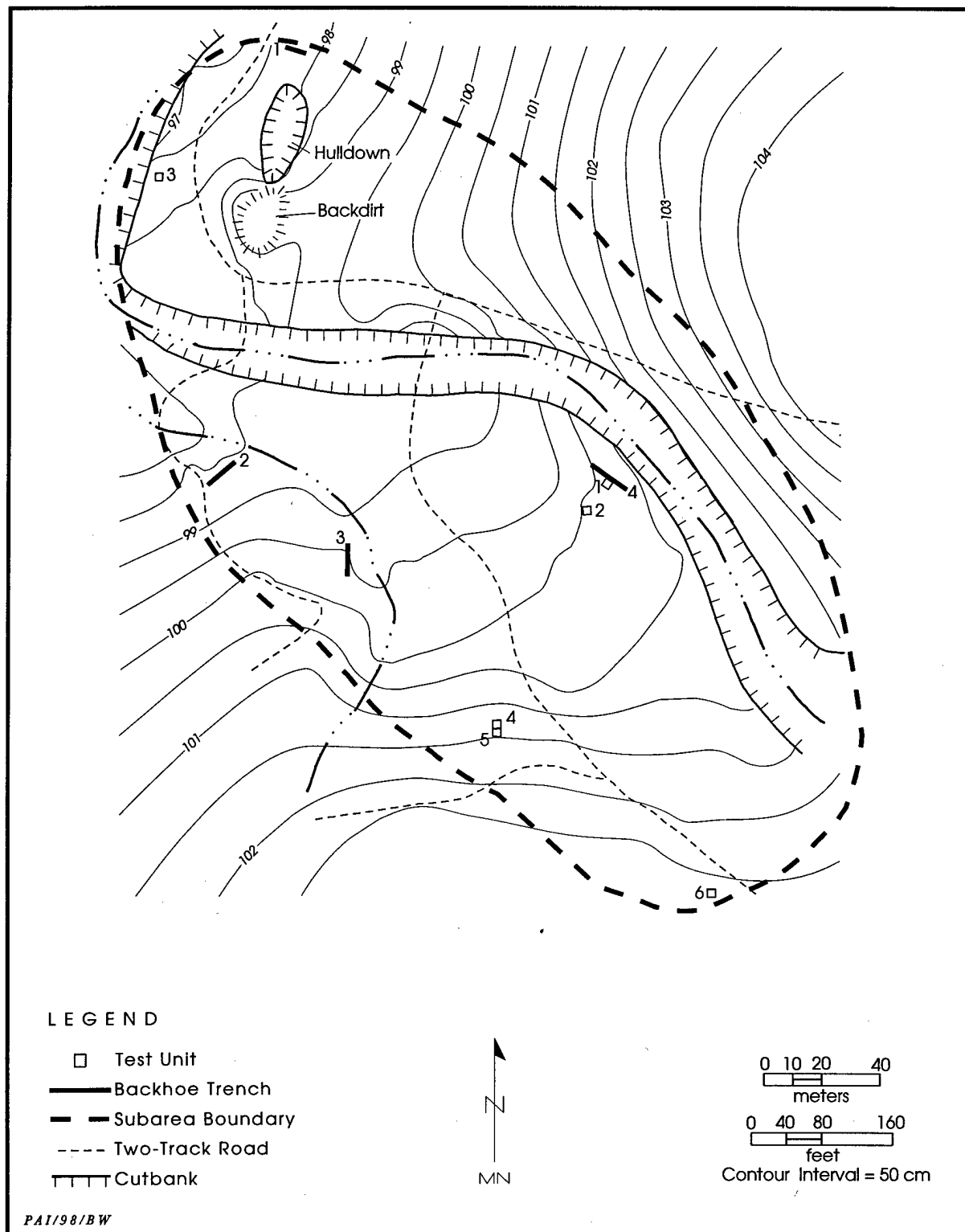


Figure 84. Map of Subarea A, 41CV1282.

exhibits an AC-2Ab-3Cu-3Bwb soil.

The 131-cm-thick profile of Backhoe Trench 3 consists of dark loamy upper West Range alluvium overlying gravelly lower West Range alluvium. The upper West Range alluvium is 57 cm thick and imprinted with an A horizon. The underlying lower West Range alluvium consists of a brown gravelly clay loam (57–110 cm) and a grayish brown gravelly clay (110–131+ cm). A few faint gleyed mottles imprinted on the grayish brown gravelly clay suggest that the basal deposits have been subjected to a fluctuating water table. These deposits are imprinted with a B-Cg soil profile.

The profile of Backhoe Trench 4 consists of 171 cm of dark loamy upper West Range alluvium overlying gravelly lower West Range alluvium. The upper West Range mantle is 70 cm thick and imprinted with an A horizon. The lower West Range alluvium consists of a 27-cm-thick clast-supported gravel bed and 74+-cm-thick grayish brown gravelly clay. These deposits are imprinted with a 2Cu-2Bwb profile.

### **Cultural Materials**

Five (18.5 percent) of 27 levels excavated from six test units produced a total of 50 burned rocks (6 kg) and 3 flakes. Thirty-five burned rocks were associated with Feature 4 (see Cultural Features), 9 cultural items were found in disturbed deposits containing recent materials.

### **Cultural Features**

Feature 4 is a basin-shaped hearth buried from 0–19 cm in Test Units 4 and 5. Its maximum excavated dimensions are 160 cm north-south by 60 cm east-west. The eastern half of the feature was not exposed; a small portion of the feature extended into the north wall of Test Unit 4. Based on the feature's morphology and exposures afforded by the excavations, the estimated dimensions of this hearth are 1.6x1.2 m. The burned rocks ( $n = 132$ , 45.5 kg) are tabular and angular pieces of fractured limestone, ranging in size from 5x7x4 cm to 24x20x6 cm. Approximately 10 percent consisted of fossiliferous limestone. Some of the rocks sloped slightly toward the middle of the hearth and a slight basin was apparent. Charcoal flecking was noted in the feature fill, but the matrix did not yield any cultural materials.

### **Discussion**

With the exception of four burned rocks at 50–60 cm in Test Unit 2, all of the cultural materials were confined to the upper 30 cm of fill. In one case, these uppermost sediments consisted of cultural deposits mixed with modern intrusive items. Although Feature 4 contained small amounts of charcoal, this shallowly buried hearth rested on dense basal gravels. This renders the integrity of the feature highly suspect. The paucity of cultural materials and dubious context of the shallowly buried features indicate that site 41CV1282 has an extremely limited archeological research potential. Based on the testing results, this site is recommended as not eligible for listing in the NRHP.

### **41CV1286**

#### **Site Setting**

Site 41CV1286 is situated on the south side of House Creek, which defines the northwestern site boundary, and extends southeast onto an upland (Killeen) surface (Figure 85). Two unnamed tributaries bisect the east-central portion of the site. Vegetation consists of dense hardwood and juniper trees along House Creek and the tributaries, scattered juniper trees and dense grasses across the terrace ( $T_1$ ) and toeslope, and scattered juniper and oak trees on slopes and the upland surface. A heavily vandalized burned rock midden (Feature 2) is located on a distal toeslope at the western margin of the site. Many military trails are present within the boundaries of the site, the most severely eroded of which are located at crossings of House Creek. Site elevation is 280–310 m above mean sea level.

#### **Previous Work**

Dureka and Frye (Texas A&M University) recorded the site on 2 June 1986 as a series of burned rock scatters and concentrations over a 950x700 m area. A small number of lithics was observed, and a Scallorn arrow point and an untyped dart point were collected. The site was estimated to be 60 percent disturbed by vehicular traffic and erosion. For management purposes, the site was later classified as a lithic resource procurement area on the basis of its

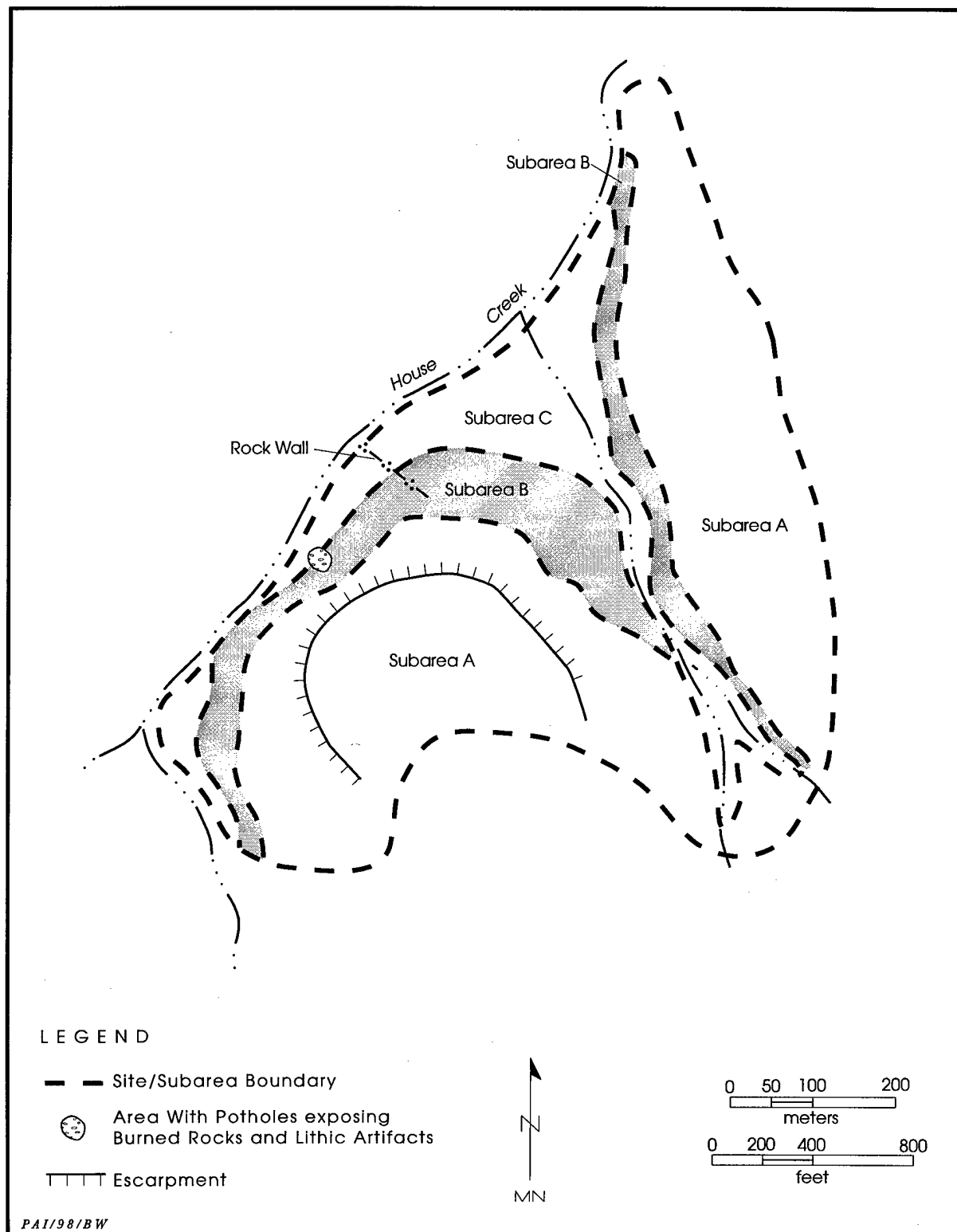


Figure 85. Site map, 41CV1286 (modified from 1992 site sketch map).

large size.

The site was revisited on 17 November 1992 by Abbott and Turpin (Mariah Associates) for archeological and geomorphological reconnaissance and assessment. The site area was defined by an irregular 800 m north-south by 750 m east-west boundary. The site was divided into Subareas A, B, and C based on differing geomorphic surfaces and potentials for intact cultural deposits.

Subarea A, the upland and erosional slopes, consisted primarily of a bare erosional surface of nodular limestone regolith, although a few areas retained a thin residual soil mantle that exhibited a Bk-K-R profile. Several burned rock and lithic scatters and two small (<5 m diameter) deflated burned rock concentrations (Features 1 and 3) were observed. An Angostura point was collected. The exposed and deflated nature of this area suggested that the majority of these materials were in secondary contexts.

Subarea B was defined as an extensive apron of colluvial toeslope deposits flanking House Creek and the tributaries that bisect the site. This gently sloping surface was observed to be alternately underlain by bedrock; Pleistocene terrace deposits (i.e., Jackson Alluvium) that exhibited a well-developed, rubified Bk horizon containing hard carbonate nodules up to 0.5 cm in diameter; and early to middle Holocene deposits (probably Fort Hood alluvium) that consisted of a stony brown loam exhibiting an Akb-Bwkb profile. A slopewashed-colluvial mantle—a stony sandy loam to silty loam up to 30 cm thick—atop this exhibited an A-Bw or an A-Bwk profile. In several locations of Subarea B, the surface had been subjected to broad lateral stripping, exposing scatters of flakes and burned rocks. At one location fronting House Creek, vandal holes along a distal toeslope revealed a buried burned rock midden (Feature 2). It was noted that the delineation between Subareas B and C was drawn for management reasons, but in reality colluvium and alluvium interfingered and overlapped one another along this boundary.

Subarea C encompassed the T<sub>1</sub> alluvial surfaces associated with House Creek and its tributaries. The terrace fronting House Creek was noted to be narrow, nearly pinching out at the southwestern site margin. At least two alluvial fills were observed to underlie this surface. Most of the exposures provided by the cutbanks of House Creek and the tributaries revealed

grayish brown to dark grayish brown stony clay loam alluvium thought to represent late Holocene West Range fill. However, exposures provided by smaller gullies incised into the surface suggested that this late Holocene fill was a relatively narrow inset, and that the main body of the terrace was comprised of brown to reddish brown loam representing an older fill, probably early to middle Holocene Fort Hood alluvium. Weak soil development was observed in the late Holocene fill (an A-Bw-C profile), while the older fill exhibited an Akb-Bwkb profile that contained abundant carbonate filaments (Nordt 1992). Adjacent to House Creek at the northeastern margin of the site, colluvial deposits were interfingered with late Holocene alluvium to a depth of at least 100 cm. Erosion of a two-track road in this location exposed a cultural lens containing chert artifacts at ca. 20 cm below the ground surface in the east side of the roadcut. A relatively well preserved large animal bone was exposed at a depth of ca. 75–100 cm in the middle of the eroded road, ca. 10 m south of the cultural lens.

Based on the geomorphic reconnaissance, it was determined that Subarea A had no potential for buried cultural deposits and no further work was recommended. Shovel testing was recommended for Subareas B and C.

A shovel testing crew returned on 1 December 1992 and excavated 56 shovel tests across Subareas B and C. In addition to the shovel tests, two 50x50-cm test pits (Test Pits 1 and 2) were excavated in the area containing the cultural lens and large animal bone. Of the 56 shovel tests, only 1 contained significant cultural materials. A high density of burned rocks and a moderate density of lithics were encountered from 0–30 cm in this test, which was excavated within Feature 2 in Subarea B. Test Pit 1 was placed over the large animal bone exposed in the road. An erosional rill exposed the bone at approximately 30–40 cm below the roadbed surface and approximately 100 cm below the original ground surface prior to the roadcut. Excavation revealed a large herbivore skull, probably *Bison*, lying upside down. The skull was more than 50 cm long, and the floor of the test pit contained other bones that were not identified. Given the size of the skull and the fragmented nature of the bone, it was concluded that complete excavation was beyond the scope of work of the shovel testing crew. Photographs

were taken of the exposure and a sketch map was drawn to facilitate re-location. Charcoal samples were recovered from above and adjacent to the skull, and a single tooth was collected. A broken screen was placed around the skull, which was then reburied in an attempt to protect it.

Test Pit 2 was excavated to 40 cm along the east side of the roadcut where several chert artifacts were exposed in the cultural lens. Level 1 (0–10 cm) was culturally sterile. The subsequent level (10–20 cm) yielded 18 stone artifacts, including numerous scrapers and edge-modified flakes and a ground piece of schist. Some of these artifacts are illustrated in Figure 86. At 20–30 cm, a single piece of debitage was found; the 30–40-cm level was culturally sterile. Researchers noted that this “cache” of tools was in close horizontal proximity to the skull in Test Pit 1, but the two finds appeared to be stratigraphically unrelated.

Kleinbach and Abbott (Mariah Associates) returned to the site on 24 March 1993 to evaluate the potential utility of the site to address questions of lithic resource procurement and reduction. Chert and impact zones were identified, mapped, and characterized, and chert samples were collected. Based on this evaluation, a crew returned to the site on 2 April 1993 and conducted quantitative artifact observations along resurvey transects.

Based on the results of these investigations, it was concluded that Subarea A had no potential for intact cultural deposits. Subarea B, particularly in the area of Feature 2, and Subarea C, which contained deposits up to 3 m thick and was demonstrated to have buried cultural materials in its northern end, both had the potential for intact cultural deposits of unknown significance. Formal testing recommended for these subareas included a minimum effort of 1–2 m<sup>2</sup> of manually excavated test units in Subarea B and 2–4 m<sup>2</sup> of manually excavated units and at least three backhoe trenches in Subarea C (Trierweiler, ed. 1994:A1427–A1433).

### Work Performed

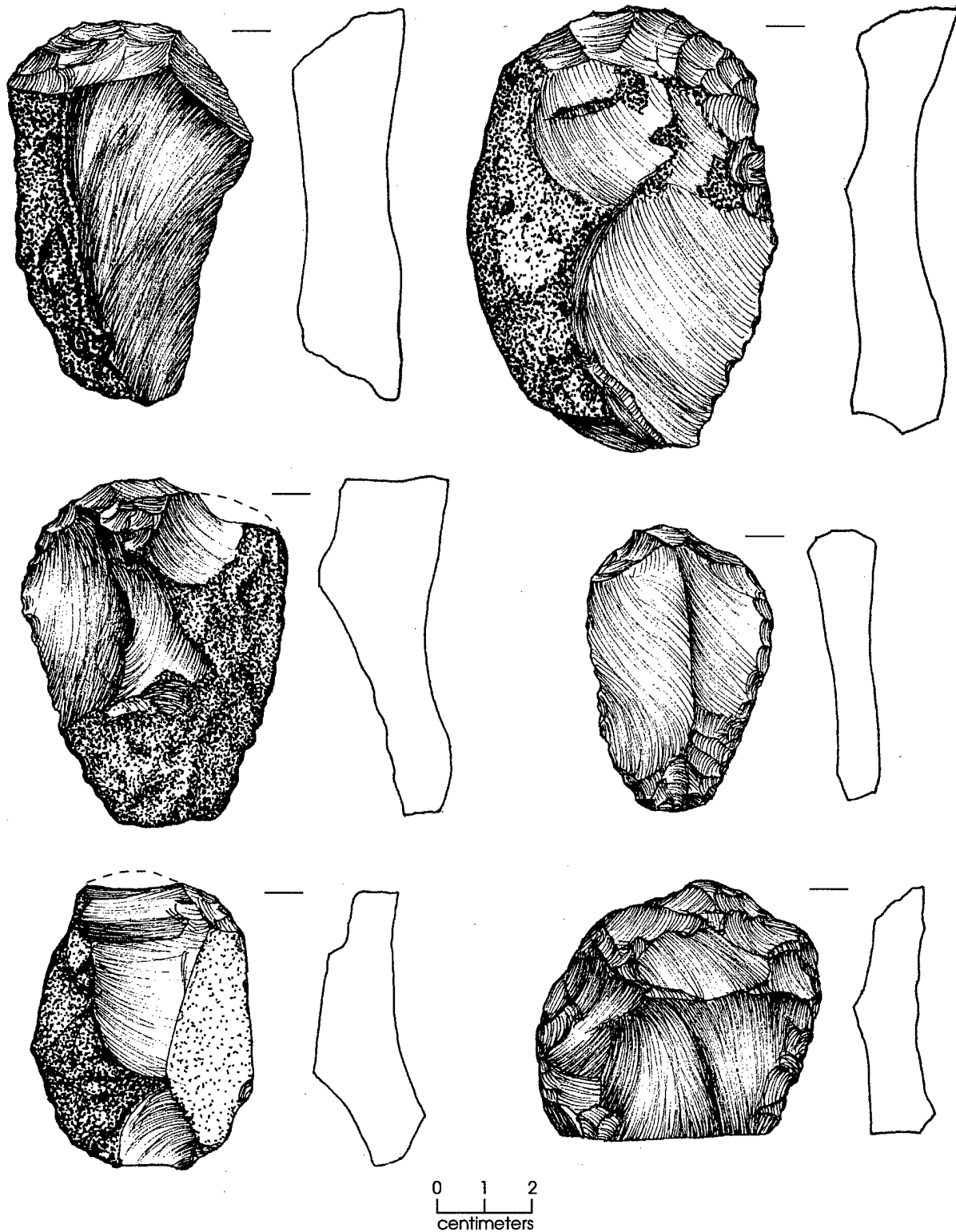
Formal testing of Subareas B and C at 41CV1286 was completed on 25 October 1996 (Figure 87). Two backhoe trenches (Backhoe Trenches 1 and 5) and one 1x1-m test unit (Test Unit 10) were excavated in Subarea B, and seven backhoe trenches (Backhoe Trenches 2–4 and 6–

9) and ten 1x1-m test units (Test Units 3–9 and 11–13) were excavated in Subarea C. A total of 6.5 m<sup>3</sup> was manually dug.

Backhoe Trench 1 (10.5x0.8x2.4 m, oriented to 300°) was excavated to bedrock on the toeslope a few meters west of vandal potholes in Feature 2. Only a few burned rocks were exposed in the profile at 10–20 cm. Backhoe Trenches 2 (10.0x0.8x1.5 m, oriented 335°), 3 (8.5x0.8x2.3 m, oriented 330°), 6 (17.0x0.8x3.0 m, oriented 350°), 7 (13.5x0.8x3.0 m, oriented 280°), 8 (12.0x0.8x3.0 m, oriented 320°), and 9 (12.5x0.8x2.3 m, oriented 280°) were randomly placed across the terrace. No cultural materials were observed in these trenches. Backhoe Trench 4 (14.0x0.8x2.9 m, oriented to 230°) was placed on the west side of the eroded road in which the possible *Bison* skull was observed. No cultural materials were observed. Backhoe Trench 5 (11.0x0.8x2.4 m, oriented to 252°) was excavated to bedrock at the toeslope southeast of this eroded road. Only a few burned rocks were observed at 20 cm among the dense colluvial gravels at the upslope end of the trench.

Since Test Pits 1 and 2 were excavated during the previous shovel testing phase, the current excavations consist of Test Units 3–13. Although the original pits could not be re-located due to recent erosional scouring, their general locations were known within a few meters based upon the detailed area sketch. Test Unit 10 was placed in Feature 2 in Subarea B; all of the other test units were placed in the vicinity of the eroded road at the northeast site margin. Prior to the excavation of test units in this area, the east edge of the roadcut in the vicinity of Test Pit 2 was scraped with shovels. One *in situ* chert scraper was discovered in the roadcut near where previous investigators found the “cache” of tools in Test Pit 2. Loose sediments were removed from the rill at the base of the road in the vicinity of Test Pit 1. Neither the protective screen nor the possible bison skull were re-located; they are assumed to have washed away. Test Units 3 and 8 (contiguous units oriented to 340°) and Test Unit 5 (oriented to 350°) were placed along the east edge of the roadcut. With the exception of these three units, all of the remaining test units were oriented to magnetic north. Depths of these excavations ranged from 40 cm in Test Unit 13 to 100 cm in Test Unit 4. Test Units 7–10 were excavated to 50 cm, Test Units 5–6 and 11–12 were excavated to





**Figure 86.** Artifacts recovered from Test Pit 2 at 41CV1286 by Mariah Associates in 1992.

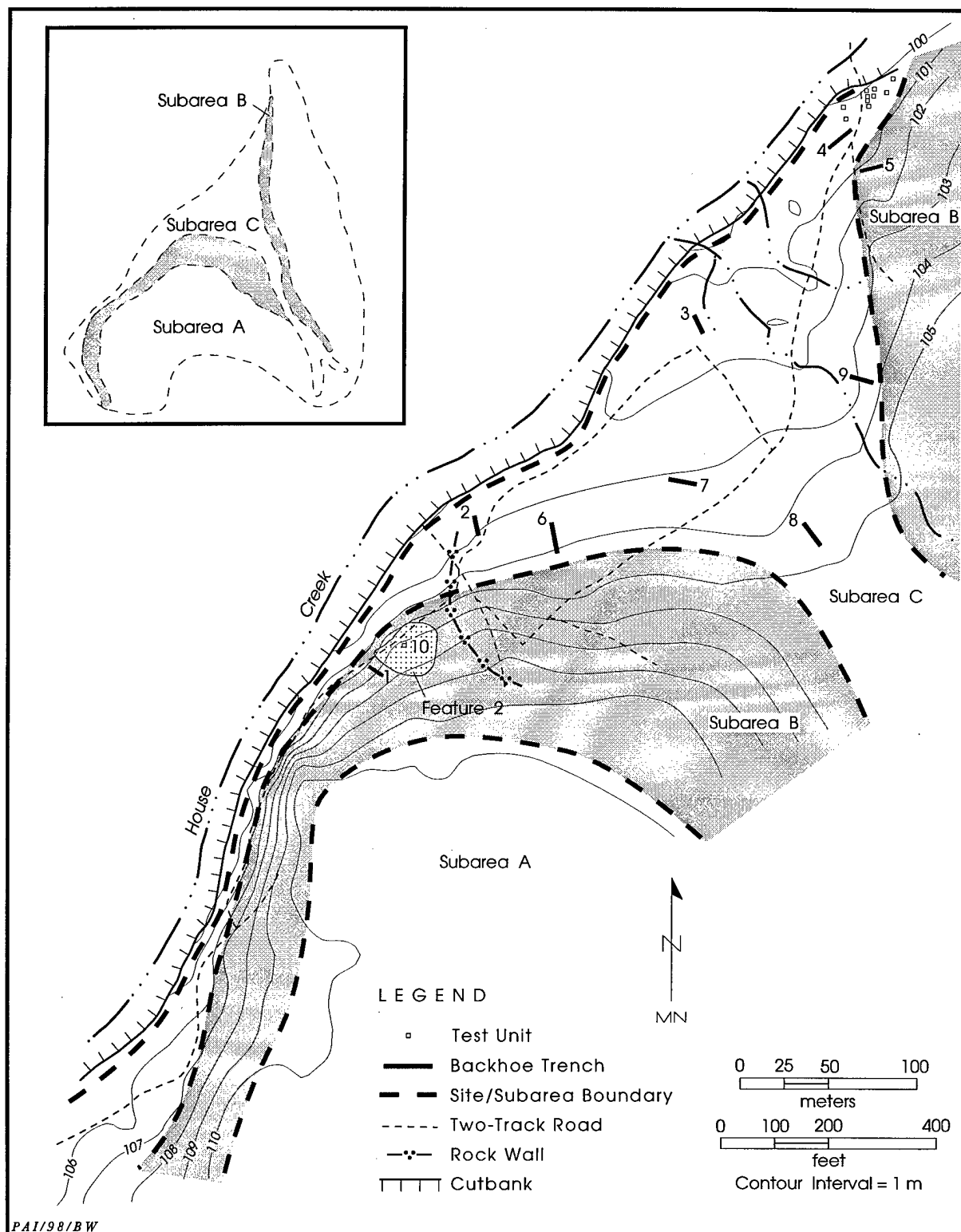


Figure 87. Map of test excavations in Subareas B and C, 41CV1286.

60 cm, and Test Unit 3 was excavated to 70 cm.

The profiles of Backhoe Trenches 1, 3, 4, 5, 6, 8, and 9, and Test Units 3 and 8 were described and soil geomorphology was assessed.

### **Sediments and Stratigraphy**

The sediments and stratigraphy of site 41CV1286 consist of late Pleistocene to late Holocene alluvium (Georgetown, Fort Hood, lower West Range, and Ford) within the T<sub>1</sub> terrace (Subarea C), and colluvium that drapes the valley wall and interfingers with the valley alluvium (Subarea B). The colluvium was examined in Backhoe Trenches 1 and 5. The profile of Backhoe Trench 1 is 223 cm thick and consists of a late Holocene gravelly to very gravelly silty clay loam and gravelly clay loam colluvium. The deposit is imprinted with an A-Bw-Bk soil. The profile of Backhoe Trench 5 is 200 cm thick and consists of late Holocene colluvium. This gravelly silty clay loam to clay loam is imprinted with an A-B-C soil.

The colluvium mantling the valley walls and slopes interfingers with the valley alluvium at the distal edge of the T<sub>1</sub> surface. Much older alluvium is preserved in this portion of the T<sub>1</sub> terrace. This is expressed in the profiles of Backhoe Trenches 6, 8, and 9. The 276-cm-thick profile of Backhoe Trench 6 consists of lower West Range alluvium (0–96 cm) overlying interbedded colluvium and Fort Hood alluvium (96–276+ cm). The lower West Range alluvium is a very dark grayish brown silty clay loam and yellowish brown gravelly silty clay loam exhibiting an A-Bw soil profile. It overlies an early to middle Holocene colluvium of brownish yellow very gravelly sandy clay. A deposit of Fort Hood alluvium lies below the colluvium. The brown to light yellowish brown Fort Hood gravelly clay loam is 96 cm thick and exhibits a 3Ab-3Bwb soil profile. The soil overlies a light yellowish brown very gravelly clay loam colluvium (261–276+ cm).

The 265-cm-thick profile of Backhoe Trench 8 revealed a mantle of interbedded late Holocene colluvium and lower West Range alluvium (0–108 cm) overlying interbedded deposits of Fort Hood alluvium and early to middle Holocene colluvium (108–265+ cm). The late Holocene deposits are comprised of a 25-cm-thick layer of lower West Range alluvium and colluvium sandwiched between gravelly clay loam

colluvial deposits. This profile is imprinted with an A-Bw-Bwk profile. The underlying deposits consist of early to middle Holocene colluvium sandwiched by Fort Hood alluvium. Fort Hood alluvium from 108–178 cm is a yellowish brown silty clay loam and light yellowish brown sandy clay loam exhibiting a truncated soil (2Bwkb-2Ck profile). Colluvium from 178–240 cm is a massive 62-cm-thick light yellowish brown to yellowish brown very gravelly clay loam. The basal deposit of Fort Hood alluvium (240–265+ cm) is a yellowish brown silty clay loam representing a truncated 5Bwb soil horizon.

The 225-cm-thick profile of Backhoe Trench 9 reveals an even more complex sequence than was seen in Backhoe Trenches 6 and 8. It consists of lower West Range and Georgetown alluvium and early to late Holocene colluvium. The late Holocene deposits are comprised of a 29-cm-thick mantle of lower West Range alluvium. This grayish brown silty clay loam is imprinted with an A horizon. It overlies a 78-cm-thick pedogenically altered (Bw-Bw2 horizons) gravelly silty clay colluvial unit. An abrupt smooth boundary separates this unit from an older colluvial deposit. The underlying early to middle Holocene colluvium (107–195 cm) is a strong brown gravelly silty clay loam to brown gravelly clay loam exhibiting a 2Ab-2Bwb soil profile. Underlying the colluvium at 195–225+ cm is a very pale brown silty clay (3Btb horizon) correlated to the Georgetown alluvial fill (Nordt 1992).

More-recent alluvial fills were observed in Backhoe Trenches 3 and 4 and the profiles of Test Units 3 and 8. This portion of the T<sub>1</sub> terrace consists of Ford alluvium inset to lower West Range deposits. The east wall profile of Test Units 3 and 8 revealed interdigitated thin to medium beds of dark clayey Ford alluvium and gravelly late Holocene colluvium. Three weakly developed soils (A-C-2Ab-2C-3Ab-3Bwb profile) were observed in this profile. The 216-cm-thick profile of Backhoe Trench 3 revealed a dark loamy to clayey Ford alluvium. The upper deposit is a 66-cm-thick very dark grayish brown clay loam with a poorly preserved thin gravel bed at its base. The deposit is designated an A horizon. Underlying the A horizon is a very dark grayish brown clay to gray silty clay loam imprinted with a 2ABb-2Bwb soil profile. The profile of Backhoe Trench 4 consists of Ford and lower West Range alluvium. A 29-cm-thick mantle of recent

gravelly sandy loam alluvium caps the deposits. It has buried a soil (2Abk-2Bwkb-2Bwb profile) formed on the 184-cm-thick dark loamy Ford alluvium. The soil rests on a massive light yellowish brown gravelly sandy clay (213–230 cm) correlated to the lower West Range. The gravelly sandy clay overlies a 37-cm-thick soil (4Ab horizon) formed on a gray clay loam. Soil humates from the buried soil (252–260 cm) yielded a conventional radiocarbon age of  $3720 \pm 70$  B.P. (Beta-102150; see Appendix A), correlating it to the lower West Range alluvium.

### Definition and Interpretation of Analysis Units

Although the overall site dimensions have been defined differently by previous investigators, only Subareas B and C were investigated during formal testing (see Figure 87). Subarea B covers a minimum of ca. 900 m northeast-southwest by 700 m northwest-southeast, but the area is irregular in shape and its linear extent conforms to the valley slope topography. Subarea C encompasses an area of approximately the same size (ca. 900 m northeast-southwest by 750 m northwest-southeast), but over 50 percent of this subarea is contained within a triangular area of ca. 300x200 m. Because cultural artifacts were recovered from two discrete areas that are 400 m apart in different subareas, two analysis units are defined. Analysis Unit 1 consists of the burned rock midden (Feature 2) located on the toeslope in Subarea B. Analysis Unit 2 includes the small segment of terrace (Subarea C) at the northeast

site margin where the majority of the test units were excavated.

### Analysis Unit 1

#### Extent and Depth

Analysis Unit 1 is estimated to cover an area of ca. 50x50 m. Sediments and stratigraphy of the area were sampled by Backhoe Trench 1. Within Test Unit 10, cultural artifacts were found from 0–50 cm, and most are associated with burned rock midden Feature 2.

#### Cultural Materials

Materials recovered from Test Unit 10/Analysis Unit 1 include 959 burned rocks (86.5 kg), 370 flakes, 1 untypeable arrow point, 1 untyped group 1 dart point (Provisional Type 1), and 16 chipped stone tools (Table 38). Fourteen (87.5 percent) of the chipped stone artifacts were recovered from Feature 2.

#### Cultural Features

Feature 2 extends all along the face of a relatively steep colluvial slope, from a flat bedrock bench on top to the bottom of the toeslope. The majority (ca. 90 percent) of its surface area is hummocky due to numerous potholes and spoil piles. Although a total of 934 burned rocks (86 kg), 347 flakes, and 14 chipped stone tools were recovered from 0–40 cm in this feature, the majority of these ( $n = 757$  burned rocks [73 kg], 291 flakes, and 12 chipped stone tools) were

Table 38. Summary of cultural materials from 41CV1286, Test Unit 10, Analysis Unit 1

Provenience	Arrow Point	Dart Point	Bifaces	Side Scraper	Miscellaneous Unifaces	Spokeshaves	Core Tool	Multifunctional Tools	Edge-modified Flakes	Unmodified Debitage	Totals
Feature 2 (0–10 cm)	–	–	–	–	–	–	–	–	–	24	24
Feature 2 (10–20 cm)	1	1	4	–	2	2	–	1	–	164	175
Feature 2 (20–30 cm)	–	–	–	–	–	–	1	1	1	127	130
Feature 2 (30–40 cm)	–	–	–	1	–	–	–	–	1	32	34
Level 5 (40–50 cm)	–	–	1	–	1	–	–	–	–	23	25
Totals	1	1	5	1	3	2	1	2	2	370	388

found from 10–30 cm. In addition, both arrow and dart points were found at 10–20 cm. No subsistence remains or charcoal were observed. All of the observed burned rocks were angular or blocky pieces. By size categories, 551 (58.9 percent) measured less than 5 cm, 376 (40.3 percent) measured 5–15 cm, and 7 (0.75 percent) measured 15–25 cm. No internal patterning was recognized. Evidence of disturbance within the test unit includes dense root growth, unburned rocks within the midden matrix, and fossilized oyster shells in each excavated level.

### Discussion

An untypeable arrow point and an untyped dart point are the only diagnostic artifacts found in Feature 2, both found at 10–20 cm. The midden is located on a steep colluvial slope at the western site margin (Analysis Unit 1), and most, if not all, of the cultural materials have obviously been reworked downslope. No subsistence or datable organic remains were discovered. Consequently, Feature 2 and Subarea B have no viable archeological research potential.

### Analysis Unit 2

#### Extent and Depth

Analysis Unit 2 covers an area of approximately 35 m north-south by 35 m east-west at the northernmost end of Subarea C (Figure 88). Cultural artifacts were found from 0–40 cm in Test Unit 3, 10–30 cm in Test Unit 4, 20–40 cm in Test Unit 8, and at 16 cm in Test Unit 9. These cultural materials are encapsulated in Ford alluvium and thin beds of late Holocene colluvium shed from the surrounding valley walls. This analysis unit is spatially confined by the areal extent of the Ford deposits, which are little more than a small wedge of alluvium inset into the lower West Range deposits that dominate Subarea C.

#### Cultural Materials

Previous investigations recovered a total of 22 artifacts that are associated with Analysis Unit 2.

When combined with the 50 artifacts recovered from Analysis Unit 2 during the current investigation, the total assemblage consists of 72 specimens and is unique in many ways (Table 39). Because of this, the artifacts recovered by Mariah Associates were reanalyzed and reclassified to be consistent with the current analysis phase. These materials are included in the discussions below. It is impossible to say whether the large animal skull found in Test Pit 1 was originally associated with Analysis Unit 2 (see below).

All of the Analysis Unit 2 artifacts recovered by Mariah Associates were found in Test Pit 2, which is the only Mariah provenience assigned to Analysis Unit 2. Although the previous report (Trierweiler, ed. 1994:A1427–A1433) lists a total of 18 tools recovered from Test Pit 2, the collection contains 22 specimens, 12 of which were found between 17 and 20 cm. The most unique artifact is a fragment of ground stone that was identified as schist, a metamorphic rock not likely to have been obtained anywhere in the vicinity of Fort Hood.

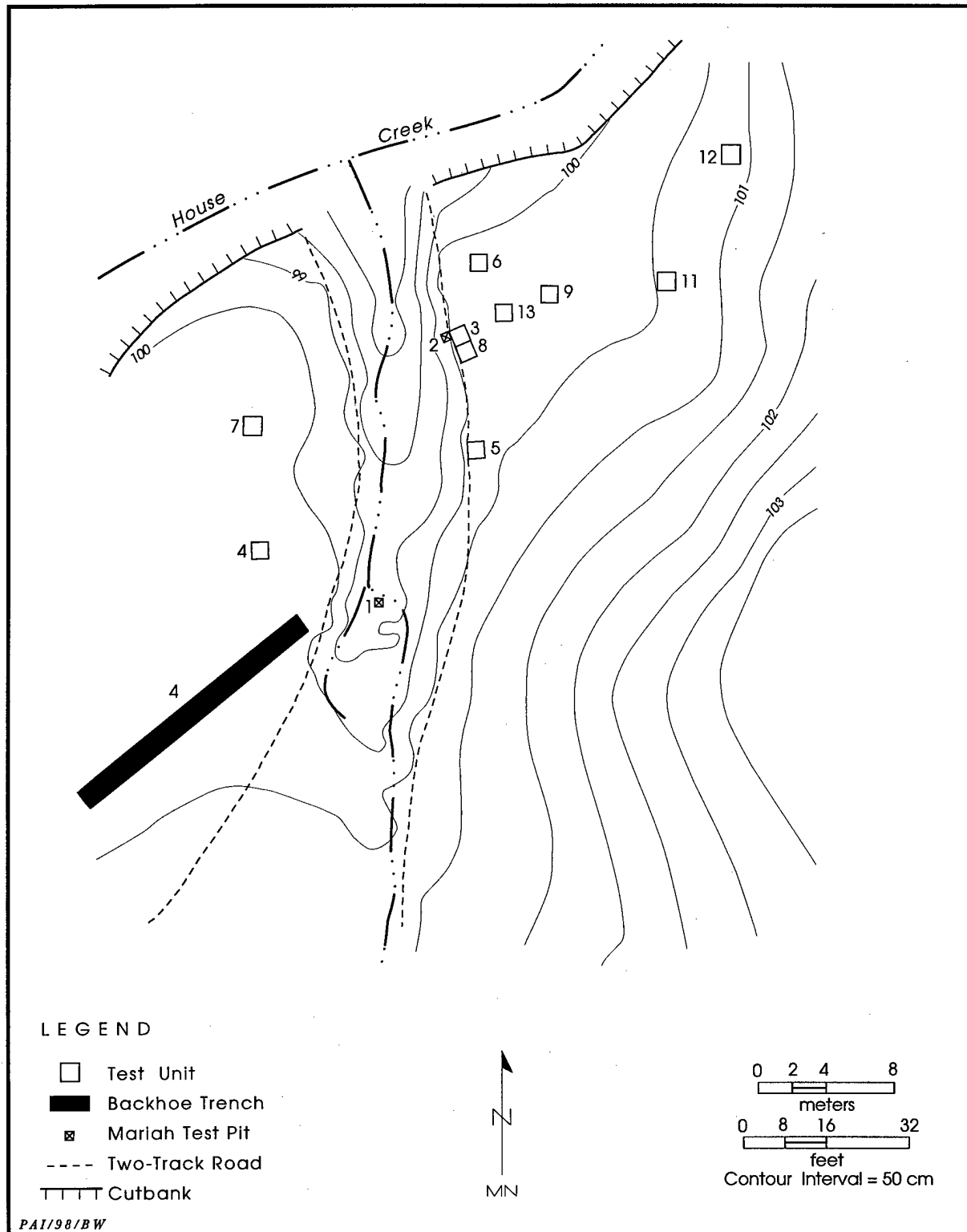
The 50 artifacts recovered by Prewitt and Associates were all found from 0–40 cm in Test Units 3, 8, and 9 (Table 40). The only other cultural items observed were burned rocks; one was found in Level 2 of Test Unit 3, one was found in Level 2 of Test Unit 4, and four were found in Level 3 of Test Unit 4. Charred organic remains were observed/collected from 10–30 cm in Test

**Table 39. Summary of all artifacts recovered from 41CV1286, Analysis Unit 2**

Artifact Class	Mariah Associates*	Prewitt and Associates	Totals
Unmodified debitage	0	41	41
End scraper	5	1	6
Side scraper	1	0	1
End/side scraper	2	5	7
Other scraper	1	0	1
Miscellaneous	0	1	1
uniface	0	1	1
Multifunctional tool**	12	1	13
Edge-modified flakes	1	0	1
Ground stone tool			
Totals	22	50	72

\* Artifacts recovered by Mariah Associates were reanalyzed and reclassified to be consistent with the current analysis.

\*\* The multifunctional tool is a combination spokeshave and miscellaneous uniface.



**Figure 88.** Map of test excavations in the northern end of Subarea C, 41CV1286.

Table 40. Summary of cultural materials from 41CV1286, Analysis Unit 2

Provenience	End Scrapers	End/Side Scrapers	Miscellaneous Uniface	Multifunctional Tool	Edge-modified Flake	Unmodified Debitage	Totals
<b>TEST UNIT 3</b>							
Level 1 (0–10 cm)	–	–	–	–	1	2	3
Level 2 (10–20 cm)	–	–	–	–	–	1	1
Level 3 (20–30 cm)	1	–	–	–	–	10	11
Level 4 (30–40 cm)	1	2	–	1	–	19	23
Level 5 (40–50 cm)	–	–	–	–	–	–	0
Level 6 (50–60 cm)	–	–	–	–	–	–	0
Level 7 (60–70 cm)	–	–	–	–	–	–	0
Subtotals	2	2	0	1	1	32	38
<b>TEST UNIT 8</b>							
Level 1 (0–10 cm)	–	–	–	–	–	–	0
Level 2 (10–20 cm)	–	–	–	–	–	–	0
Level 3 (20–30 cm)	–	1	–	–	–	–	1
Level 4 (30–40 cm)	–	–	1	–	–	9	10
Level 5 (40–50 cm)	–	–	–	–	–	–	0
Subtotals	0	1	1	0	0	9	11
<b>TEST UNIT 9</b>							
Level 2 (10–20 cm)	1	0	0	0	0	0	1
Totals	3	3	1	1	1	41	50

Pit 2, from 30–40 cm in Test Unit 3, from 30–60 cm in Test Unit 5, from 30–40 cm in Test Unit 6, and from 20–30 cm in Test Unit 12.

Although the artifacts were found in several levels in three test units, contiguous Test Units 3 and 8 yielded the majority of materials in a single level; 66 percent of the artifacts (33 of the 50 specimens) were found from 30–40 cm, and many appeared to be lying horizontally on a living surface. Recovery away from these units was sparse or nonexistent. A single end scraper from 20–30 cm in Test Unit 9 indicates that the occupational debris extends east beyond Test Units 3 and 8, but it suggests that the depth of the living surface may vary slightly. The burned rocks observed in Test Unit 4 indicated that the shallowly buried occupation zone is present across the road from Test Units 3 and 8.

### Discussion

The Analysis Unit 2 cultural deposits are shallowly buried in the Ford alluvial unit within

Subarea C. While no temporally diagnostic artifacts were recovered, a piece of charcoal collected from 35 cm in Test Unit 3 yielded a conventional radiocarbon age of  $440 \pm 40$  B.P. (Beta-102149; see Appendix A). Thus, these deposits appear to represent cultural activities during the Toyah phase of the Late Prehistoric period.

All of the stone tools were found lying horizontally, although their depths varied from 10–37 cm below the surface due to erosional beveling of the ground surface. These tools appear to represent cultural residue associated with a rather discrete Toyah phase component. The combined assemblages contain 31 stone tools that reflect a rather specialized tool kit. The attributes of these tools are summarized in Table 41. Although no features were encountered, the Analysis Unit 2 assemblage is suggestive of very specialized processing activities. Except for a single piece of an undefined ground stone tool, all of the tools are unifacial scrapers and edge-modified flakes. These tools are commonly associated with cutting and

Table 41. Stone tools recovered from 41CV1286\*

Tool Number (Accession)	Tool Type	Material (Chert Type)	Completeness	Amount of Dorsal Cortex**	Length	Width	Thickness
<b>Artifacts recovered by Mariah Associates from Test Pit 2</b>							
1 (004)	end scraper	chert (3)	complete	low	79.1	51.2	18.5
2 (004)	end/side scraper	chert (9)	distal fragment	none	52.8	53.6	15.3
3 (003)	end scraper	chert (3)	complete	low	89.9	62.3	18.4
4 (004)	end scraper	chert (35)	complete	high	70.1	53.3	24.2
5 (005)	end scraper	chert (35)	complete	none	57.2	37.7	12.7
6 (012)	edge-modified flake	chert (3)	complete	low	109.2	52.3	25.9
7 (011)	edge-modified flake	chert (31)	complete	high	99.4	49.8	18.9
8 (011)	edge-modified flake	chert (3)	proximal fragment	none	59.9	35.4	6.9
9 (011)	end scraper	chert (3)	complete	none	55.6	43.9	16.2
10 (011)	edge-modified flake	chert (31)	nearly complete	high	69.4	53.0	17.4
11 (011)	other scraper	chert (3)	distal fragment	high	49.1	98.3	28.9
12 (011)	edge-modified flake	chert (31)	proximal fragment	none	83.5	44.6	13.2
13 (011)	edge-modified flake	chert (3)	complete	low	25.3	38.1	5.5
14 (011)	edge-modified flake	chert (3)	proximal fragment	none	60.0	97.2	21.0
15 (011)	edge-modified flake	chert (35)	complete	high	83.6	65.1	20.6
16 (011)	edge-modified flake	chert (3)	complete	low	103.2	84.1	28.0
17 (011)	end/side scraper	chert (35)	complete	low	106.0	39.2	23.0
18 (011)	edge-modified flake	chert (3)	distal fragment	none	66.0	21.5	14.3
19 (011)	edge-modified flake	chert (3)	complete	low	97.4	58.3	21.3
20 (011)	side scraper	chert (3)	complete	high	109.3	66.5	28.5
21 (011)	edge-modified flake	chert (3)	complete	low	75.1	47.9	19.8
22 (001)	ground stone	schist	fragment	-	68.7	52.5	10.1
<b>Artifacts recovered by Prewitt and Associates from Test Units 3, 8, and 9</b>							
23 (052-1)	end scraper	chert (3)	nearly complete	low	60.1	48.1	16.5
24 (038-1)	end/side scraper	chert (14)	complete	low	51.6	43.7	11.2
25 (039-1)	end/side scraper	chert (35)	distal fragment	none	42.8	38.0	12.4
26 (040-1)	end/side scraper	chert (35)	complete	low	76.8	51.2	11.4
27 (049-1)	end/side scraper	chert (3)	complete	low	67.3	67.1	21.2
28 (053-1)	end/side scraper	chert (3)	complete	high	60.7	55.8	19.1
29 (051-1)	miscellaneous uniface	chert (3)	complete	low	72.3	61.0	11.2
30 (054-1)	multifunctional tool***	chert (35)	complete	none	69.6	56.4	14.1
31 (035-1)	edge-modified flake	chert (34)	proximal fragment	none	36.8	17.6	4.0

\* Data presented here for artifacts recovered by Mariah Associates are based on a reexamination of the specimens.

\*\* Dorsal cortex is stated as: none = 0 percent; low = 1-50 percent; high = 50-90 percent; total = 100 percent.

\*\*\* The multifunctional tool is a combination spokeshave/miscellaneous uniface.



scraping activities in bison-hunting groups. A few of the tools are rather typical of the Plains-style end scrapers commonly found at Late Prehistoric bison-hunting sites. The overall assemblage may represent cutting and scraping tools used in the processing of bison hides. Since no faunal remains are associated with Analysis Unit 2, however, this interpretation is tentative.

Because the large animal skull (possibly bison) found in Test Pit 1 was not collected and it could not be re-located, there is considerable uncertainty regarding what this find represents and why it was found at 41CV1286. A deep gully was observed in the bottom of the roadbed in the approximate area where Test Pit 1 would have been. After a careful examination of the area, weathered bone fragments were observed in the erosional gully in the tank trail, and many fragments of bone were observed upslope of where the skull had been. Thus, it appears unlikely that the skull represents an *in situ* cultural component at over 100 cm in depth. No hint of cultural materials at this depth was seen in Backhoe Trenches 4 or 5, or anywhere else along the roadbed. Perhaps a more likely explanation is that the skull and other bones had recently washed into the gully but were fortuitously exposed when the site was discovered in 1992. If this is the case, however, one is left wondering whether it was a modern cow skull or perhaps a bison skull that washed out from the overlying Toyah phase cultural deposits. If it was a bison skull, then the complete absence of bones in the Toyah deposits is perplexing. At this point, stating the origin of this skull is purely speculative at best. Since erosion has removed all traces of these faunal remains, the safest option is to not assign this material to any analysis unit and to assume that it may not even be cultural. It is safe to say, however, that there is no good evidence for deeply buried archeological remains. The Toyah phase materials in the upper 40 cm of alluvial deposits represent the only definable cultural component in this portion of the site.

### **Summary and Conclusions**

Site 41CV1286 is a large open camp that extends from the alluvial terrace on the south side of House Creek up onto the uplands. Previous investigators divided the site into Subareas A,

B, and C based on differing geomorphic contexts. During the current investigation, no work was done in Subarea A, the upland portion of the site, which was evaluated as having no potential to contain intact deposits. Further work was done in the colluvial deposits in Subarea B, concentrating on burned rock midden Feature 2. These cultural deposits were defined as Analysis Unit 1 but were found to be highly disturbed by natural processes and vandalism. No subsistence or organic remains were recovered, and no internal features or recognizable patterning to the angular burned rocks could be identified.

Investigations in Subarea C included scattered backhoe trenches that yielded no cultural materials, confirming that there is little or no archeological evidence buried in the various alluvial fills comprising most of the terrace. The exception is the Ford deposits along the proximal portion of the terrace in the northern end of Subarea C. These investigations targeted the area where previous investigators found a possible bison skull in the bottom of a tank trail and a "cache" of chipped stone tools in a nearby test pit adjacent to the tank trail. The current investigation found no evidence of the buried animal skull, which is assumed to have washed away.

Continued testing (ten 1x1-m units) in the vicinity of the previously identified tool "cache" revealed a shallowly buried cultural component from ca. 10–40 cm in Ford alluvium. Additional evidence suggests that the 22 stone tools found in the 1992 Test Pit 2 are not a "cache," but apparently represent artifacts scattered on a living surface. No features were found, but the overall artifact assemblage is suggestive of a specialized campsite where hide-processing activities were dominant. The low density of artifacts, along with their stratigraphic relationships, suggests the likelihood that Analysis Unit 2 represents a very short term, perhaps single-event, campsite. A calibrated radiocarbon date of A.D. 1435–1470 indicates that this occupational debris represents the Toyah phase.

Analysis Unit 2 represents a discrete archeological component with a high research potential. This portion of Subarea C is characterized by a very low artifact density which varies considerably from unit to unit. Consequently, it is not the expected artifact recovery rates that make this site important. Rather, its significance is derived from the fact that this component

represents a brief occupational episode in good stratigraphic context (i.e., an example of the *gisements* described by Collins [1995]).

Subarea B at 41CV1286 does not contain significant intact cultural deposits, and it is recommended that this area be considered ineligible for inclusion in the NRHP. The northeastern end of Subarea C, however, has produced evidence of a discrete, shallowly buried prehistoric component that has considerable potential to provide archeological data useful for addressing key issues outlined in the Fort Hood research design (Ellis et al. 1994). Given this high archeological potential, we recommend that Subarea C at 41CV1286 be considered eligible for listing in the NRHP. In situ preservation and protection of the significant part of Subarea C is not a realistic option. Because the terrace remnant containing the buried component is so small (ca. 35x35 m) and is located adjacent to a heavily used tank trail, mitigation through data recovery is the most viable management option.

#### 41CV1287

##### Site Setting

Site 41CV1287 is situated on a north-facing slope and terrace complex on the south side of Ripstein Creek. Ripstein Creek defines the northern site boundary, and two unnamed tributaries bisect the site (Figure 89). With the exception of narrow strips of juniper and oak trees along the tributaries and scattered junipers on the slope, the vegetation on the site is characteristic of open grasslands. The site has been highly disturbed by ubiquitous erosion and numerous military trails/vehicular traffic. Site elevation is 290 m above mean sea level.

##### Previous Work

Rodriguez and Mehalchick (Texas A&M University) initially recorded the site on 6 September 1986 as a burned rock and lithic scatter. Site dimensions were defined as 350 m east-west by 180 m north-south. One dart point was collected. The site was estimated to be 95 percent impacted by tracked vehicles and erosion.

Trierweiler and Frederick (Mariah Associates) reassessed the site on 14 June 1992. Site dimensions were altered to 360x165 m, with a northeast-southwest long axis. Based on differ-

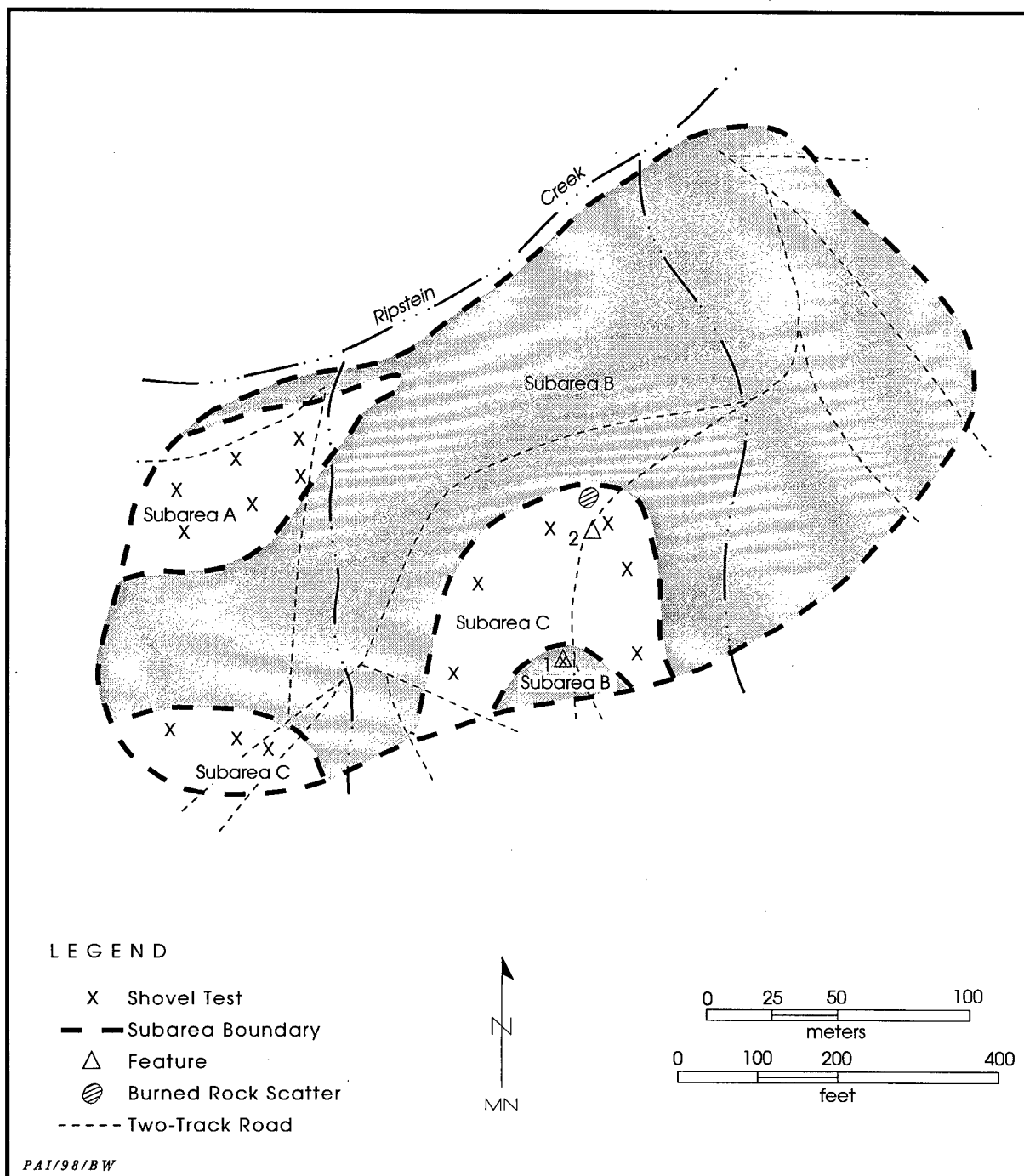
ing geomorphic contexts and the potentials for intact cultural deposits, the site was divided into Subareas A, B, and C.

Subarea A included a gently sloping terrace along Ripstein Creek at the northwestern site margin. An A-C profile, formed in silt loam, was observed. Although no cultural materials were observed on the surface of this subarea, the terrace potentially contained more than a meter of alluvial-colluvial deposition.

Subarea B comprised the majority of the site, which consisted of stepped limestone slope (Glen Rose) that was largely denuded by sheet erosion. Remnants of thin deposits (A-R profile) occurred across most of this surface, although a thin mantle of colluvium (Cu-R profile) was present in some areas. Jackson alluvium (Nordt 1992) was observed at the northeastern margin of this subarea and was defined by its advanced stage of soil development (A-Bt-Btk-Bk-K profile). Several small deflated burned rock and lithic scatters were observed on the colluvial slope. At the south-central margin of Subarea B, a burned rock mound (Feature 1) was situated near the edge of a bench escarpment. The mound, approximately 5 m in diameter with 20–30 cm of relief, appeared to be undisturbed.

Subarea C encompassed two small, sand-covered benches (one at the southwestern margin of the site and the other at the south-central site margin) immediately downslope of sandy Cretaceous outcrops believed to be the Paluxy sand. An A-C profile was formed within the sandy solum, which appeared to be colluvium derived from the weathering of the Paluxy sand outcrops. Sparse burned rocks and lithic artifacts were scattered across these gently sloping surfaces, and several shallowly buried burned rock features were exposed in road cuts in the south-central portion of the subarea, including a burned rock concentration (Feature 2).

All three subareas had the potential for buried cultural deposits, and shovel testing was recommended for each. On 25 June 1992, a crew excavated a total of 16 shovel tests (6 in Subarea A, 1 in Subarea B, and 9 in Subarea C). Only two of the tests (33.3 percent) in Subarea A were positive, yielding a total of three flakes from 10–30 cm. The test excavated on the mound (Feature 1) in Subarea B produced 45 burned rocks from 0–20 cm. The excavation was terminated on bedrock at 30 cm. A military item found at 0–10 cm indicated that some shallow



**Figure 89.** Site map, 41CV1287 (modified from Trierweiler, ed. 1994:A1435).

disturbance had occurred. Seven of the tests (77.8 percent) in Subarea C were positive. Six of these yielded sparse cultural materials at 0–10 and 20–30 cm, including a Martindale found at 0–10 cm and an Ellis found at 20–30 cm. The other

positive test was placed adjacent the burned rock concentration (Feature 2) and produced 12 burned rocks and 1 biface fragment at 0–10 cm.

Shovel testing results indicated that Subareas A and C and Feature 1 in Subarea B had the

potential to contain intact cultural deposits of unknown significance. A minimum testing effort of 4 m<sup>2</sup> of manually excavated test units in each subarea was recommended to determine the NRHP eligibility of the site (Trierweiler, ed. 1994:A1434–A1436).

### Work Performed

On 23 August 1996, Prewitt and Associates completed formal testing of 41CV1287 (Figure 90). A total of six 1x1-m test units (Test Units 1–6) were excavated (2.3 m<sup>3</sup>). The profiles of Test Units 1, 4, and 6 were described and soil geomorphology was assessed.

Upslope from Ripstein Creek, Test Unit 6 was placed near the back edge of the terrace defined as Subarea A, Test Units 2–5 were placed across the south-central sandy bench in Subarea C, and Test Unit 1 was placed on Feature 1 in Subarea B. Test Unit 6 was excavated to dense gravels and fossilized oysters at 30 cm. Test Units 2–5 and 6 were excavated to bedrock at 40, 27, 50, 46, and 23 cm, respectively. All test units were oriented to magnetic north.

### Site Extent and Depth

Site 41CV1287 covers an area of 350 m northeast-southwest by 175 m northwest-

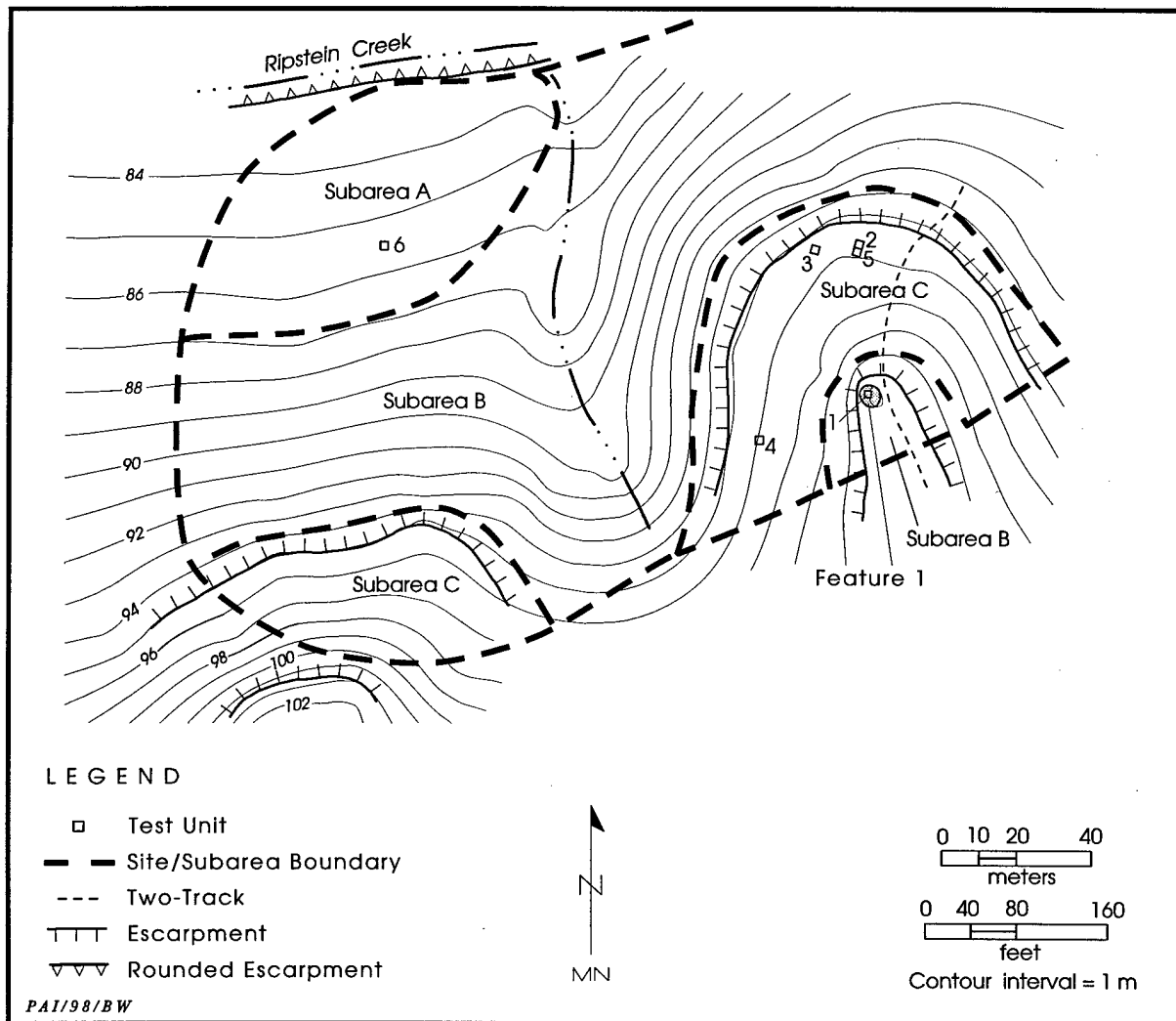


Figure 90. Map of tested portion of 41CV1287.

southeast. From the terrace up onto the stepped slope, cultural artifacts were found at 0–20 cm in Test Unit 6 in Subarea A; at 10–30, 0–27, 0–40, and 10–40 cm in Test Units 2–5, respectively (in Subarea C); and at 0–23 cm in Feature 1 in Subarea C.

### **Sediments and Stratigraphy**

In Subarea A, the 31-cm-thick profile of Test Unit 6 consists of Holocene-age colluvium imprinted with an A-Bw soil. The A horizon is a dark gray silty clay with a brown to dark brown very gravelly clay Bw horizon. In Subarea B, the thin profile of Test Unit 1 revealed a dark grayish brown gravelly clay loam (A horizon) resting on limestone bedrock (R horizon). In Subarea C, the 46-cm-thick profile of Test Unit 4 revealed a thin mantle of Holocene colluvium. This deposit consists of a dark grayish brown silt loam with matrix-supported gravels (A horizon) overlying a pale brown silty clay (Bw horizon).

### **Cultural Materials**

Within Subarea A, Test Unit 6 produced 4 flakes and 1 burned rock. Within Subarea B in Test Unit 1, all recovered artifacts (2 flakes, 1 limestone metate fragment, and 175 burned rocks) were found in Feature 1. One flotation sample was collected from Feature 1. Within Subarea C, 1 flake and 18 (7.5 kg) burned rocks were found in Test Unit 2; 3 flakes, 2 stone tools, and 22 (1.5 kg) burned rocks were recovered from Test Unit 3; 7 flakes, 1 edge-modified flake, 1 untypeable dart point (0–10 cm), 1 Pedernales point (20–30 cm), and 11 burned rocks (1.5 kg) were found in Test Unit 4; and 2 flakes and 29 (13.5 kg) burned rocks were recovered from Test Unit 5. Recent military items were found in the upper 10 cm of Test Units 1, 2, and 4.

### **Cultural Features**

Feature 1 is a 6-m-diameter domed burned rock mound. Although no central depression was apparent, the feature is covered by several juniper trees whose growth has highly disturbed the feature. Although the highest point (center) of the mound exhibits 20–25 cm of relief above the ground surface, the outer 2-m perimeter is completely deflated, with burned rocks resting directly on bedrock. As mentioned above, 175

burned rocks (61.5 kg) and only 3 stone artifacts were recovered from the feature. Approximately 80 percent of the burned rocks were fist-sized and smaller angular pieces, with the remainder consisting of blocky fractured clasts. No patterning to the burned rocks was identified and no central feature was discovered. Although not submitted for macrobotanical analysis, a processed flotation sample contained sparse microdebitage.

In Test Unit 5, a burned rock concentration (Feature 3) was discovered in the southwest quadrant at 20–32 cm. Maximum excavated feature dimensions were 55 cm east-west by 24 cm north-south; burned rocks visible in the unit's west and south walls indicate that the feature is larger. The excavated portion of Feature 3 consisted of one to two layers of burned rocks ( $n = 15$ , 6.5 kg), the majority of which were lying horizontally. Although a few of the burned rocks were tabular (reaching 14x10x4 cm), most were fist-sized angular pieces. No cultural materials were recovered from the feature fill, and no evidence that the burned rocks were in situ was discerned. Artifacts found in the surrounding matrix and probably associated with Feature 3 include 14 burned rocks (7 kg) scattered across the northern section of Test Unit 5 at 30–40 cm and 16 (7.5 kg) scattered burned rocks found at 20–30 cm in adjacent Test Unit 2.

### **Discussion**

Varying amounts of debitage and burned rocks, six tools, one untypeable dart point, and a single Pedernales dart point were the only artifacts recovered during the present investigation. No subsistence or dateable organic remains were found. Very few artifacts were discovered in the terrace sediments of Subarea A. The only portion of Subarea B recommended for testing was a low-relief burned rock mound (Feature 1) situated near the edge of a severely denuded, midslope bench. Placed near the apex of the feature, the excavation of Test Unit 1 indicates that the 23-cm-thick burned rock mound rests on weathered bedrock and has been highly disturbed by erosion and bioturbation. In Subarea C, few artifacts were found in Test Units 3 and 4, and although Test Unit 5 contained a burned rock concentration (Feature 3) which is potentially the dispersed remains of a hearth and an associated ephemeral burned rock scatter from

ca. 20–40 cm in Test Units 5 and 2, the absence of perishable remains and intact features suggests that the contextual integrity of these deposits has been compromised due to long-term exposure on the slope. Therefore, none of the cultural deposits at 41CV1287 has the potential to yield substantial archeological data.

#### 41CV1308

##### Site Setting

Site 41CV1308 is situated on the south side of House Creek, with the creek defining the northern site boundary (Figure 91). The site is bounded on the east and west by two unnamed tributaries that join House Creek at the northeast and northwest corners of the site. From House Creek, the site extends south across a narrow alluvial ( $T_1$ ) terrace onto stepped erosional slopes and an upland Killeen (Nordt 1992) surface. The terrace is covered by a dense hardwood forest, and the slopes and upland are covered with stands of juniper and oak broken by open, grassy areas. While the terrace has been minimally disturbed by cutbank erosion, the slopes and upland have been impacted by ubiquitous sheet erosion and several military trails. Site elevation is 300 m above mean sea level.

##### Previous Work

On 19 June 1986, Kooren and Schweigert (Texas A&M University) recorded the site as a burned rock and lithic scatter. Site dimensions were defined as 625x300 m, with a northeast-southwest long axis. An untyped dart point and one Golondrina were collected. An estimated 50 percent of the site was disturbed by tracked vehicles, bivouac, erosion, and cattle. For management purposes, the site was later classified as a lithic resource procurement area (LRPA).

Abbott and Turpin (Mariah Associates) revisited and reevaluated the site on 17 November 1992. Site dimensions were altered to 530 m northeast-southwest by 350 southeast-northwest. Based on differing geomorphic contexts and archeological potentials, the site was divided into Subareas A and B. Comprising the vast majority of the site, Subarea A included the upland and stepped erosional slopes of the Killeen surface. Much of the subarea was strongly erosional and consisted of a bare surface

of nodular limestone regolith. The relatively level upland surface and broader benches had a thin residual soil mantle exhibiting an A-Bw-C-R or A-Bw-K-R profile. Although a number of burned rock and lithic scatters were noted across this surface, the potential for cultural deposits in primary context was negligible.

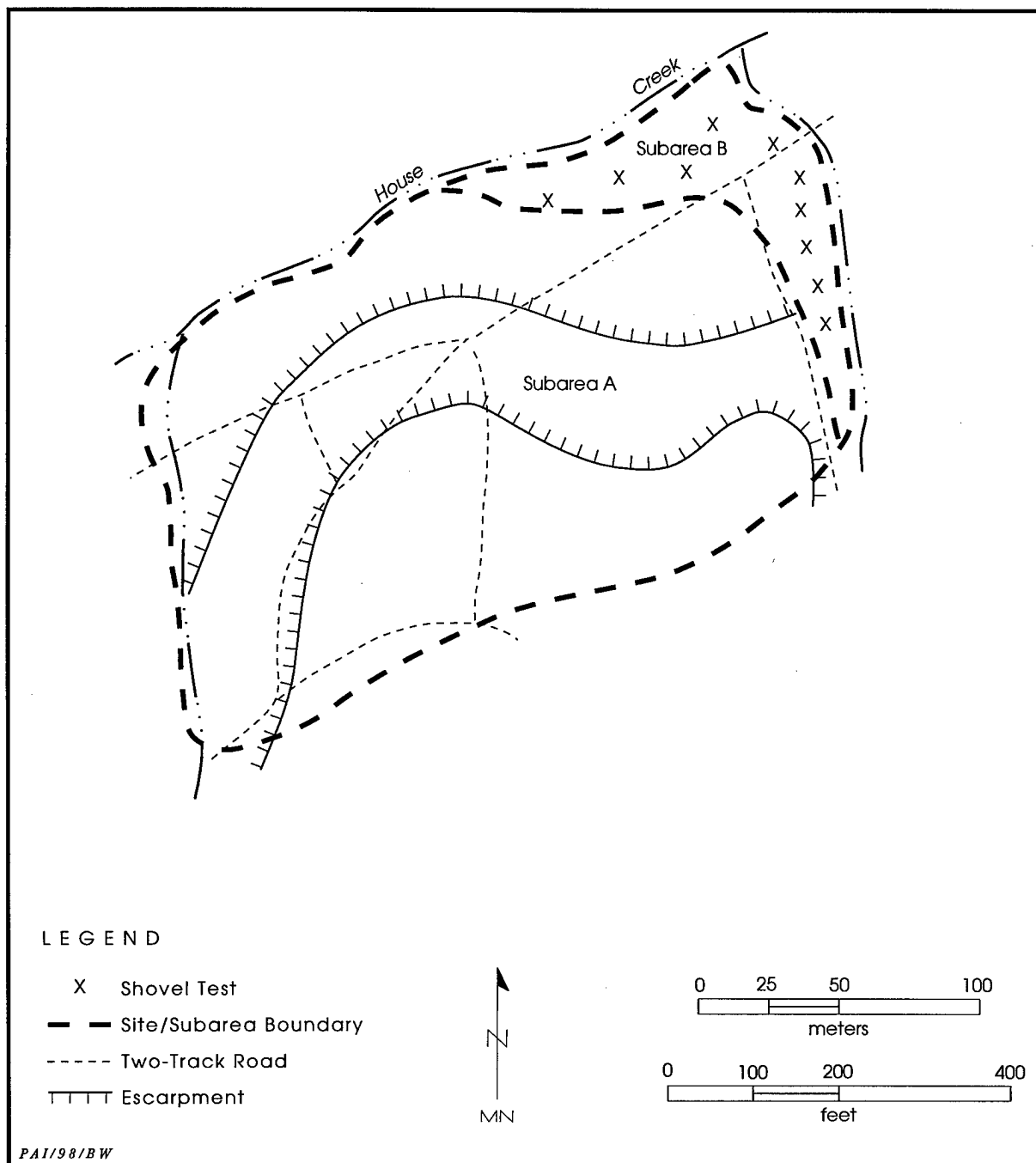
On 23 March 1993, Abbott and Kleinbach (Mariah Associates) revisited the site to evaluate the potential of Subarea A to address questions of lithic resource procurement and reduction. Chert and impact zones were identified, mapped, and described, and samples of unmodified chert were collected. Since chert resources were observed and the subarea was not considered to be completely impacted, a crew resurveyed portions of Subarea A on 25 March 1993. The resurvey indicated that the surface of Subarea A had limited potential for lithic procurement research, and no further management was recommended.

Subarea B encompassed a crescent-shaped expanse of the  $T_1$  alluvial surface associated with House Creek and its tributary in the northeastern corner of the site. This surface was 3.5–5 m above the modern stream. The cutbank exposures revealed a 1.5-m-thick grayish brown to dark grayish brown stony clay loam (A-Bk-C or A-C profile) that probably represented the West Range alluvium (Nordt 1992). A thin scatter of burned rocks and debitage was noted on the surface. Due to the potential for buried cultural deposits in Subarea B, shovel testing was recommended.

On 12 December 1992, a crew excavated 10 shovel tests in Subarea B. Two shovel tests (20 percent) yielded a total of three flakes at 0–20 cm. Even though the shovel tests yielded sparse cultural materials, deeply buried deposits below the level of testing were not sampled. These deposits were of unknown significance and were potentially eligible for NRHP listing. The recommended testing effort included at least one backhoe trench and 1–2 m<sup>2</sup> of manually excavated test units to determine the NRHP eligibility of Subarea B (Trierweiler, ed. 1994: A1443–A1446).

##### Work Performed

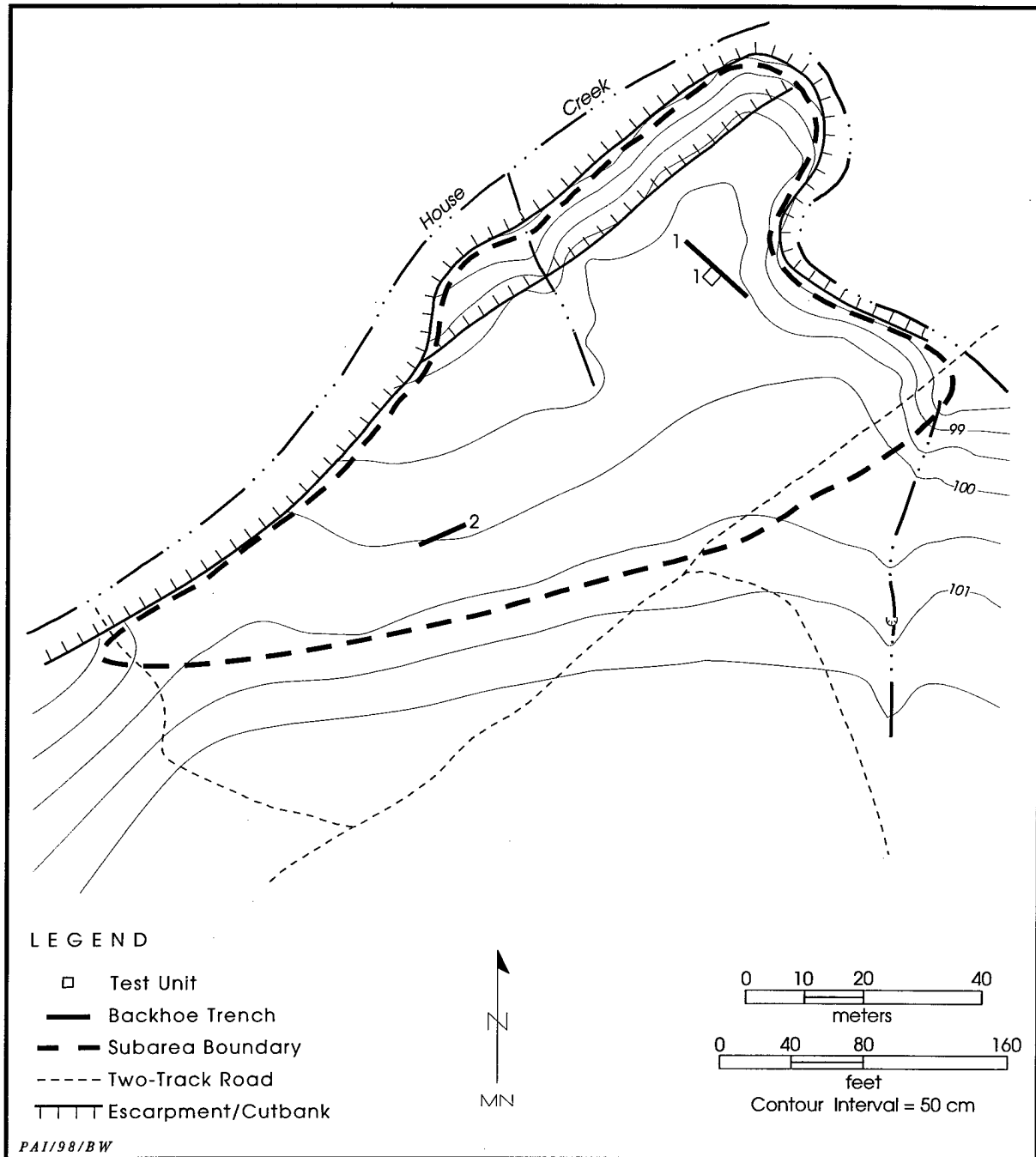
On 4 October 1996, Prewitt and Associates completed formal testing of site 41CV1308, Subarea B (Figure 92). The terrace comprising this subarea was found to be larger than previously mapped, and the subarea size was expanded



**Figure 91.** Site map, 41CV1308 (modified from Trierweiler, ed. 1994:A1444).

to 150 m northeast-southwest by 90 m northwest-southeast. Two backhoe trenches and a single 1x1-m test unit were excavated. A total of 1.6 m<sup>3</sup> was manually dug. Backhoe Trench 1 (15.0x0.8x1.9 m), oriented to 311° magnetic north and excavated to dense gravels, was placed

above the confluence of House Creek and the unnamed tributary at the northeast edge of the site. Backhoe Trench 2 (10.0x0.8x1.5 m), oriented to 234° magnetic north and excavated to bedrock, was placed along the back side of the terrace ca. 50 m west of Backhoe Trench 1. No cultural mate-



**Figure 92.** Map of Subarea B, 41CV1308.

rials were observed in the profiles or on the back-dirt piles of either trench. The profile of each of the trenches was described and soil geomorphology was assessed. Test Unit 1, placed along and oriented with the west wall of Backhoe Trench 1, was excavated to dense gravels at 160 cm.

### Site Extent and Depth

Current investigations were limited to Subarea B of 41CV1308, as redefined in 1996. It covers an area of 150x90 m along the south bank of House Creek. In Test Unit 1, a few cultural



materials were found to a depth of 160 cm.

### Sediments and Stratigraphy

Examination of backhoe trench profiles at 41CV1308 revealed Ford and West Range alluvial deposits (see Appendix B) (Figure 93). The 170 cm-thick profile of Backhoe Trench 1 consists of dark loamy and gravelly Ford alluvium (0–102 cm) overlying dark gray clayey and gravelly West Range alluvium (120–170+ cm). The fine-grained Ford sediments contain thin gravel beds and are imprinted with one soil consisting of a very dark grayish brown clay loam A horizon and a dark grayish brown gravelly clay loam Bw horizon. The underlying West Range fill is imprinted with a 2Ab-2C soil profile. Soil humates of a bulk sediment sample from the 2Ab horizon yielded a  $\delta^{13}\text{C}$ -corrected radiocarbon assay of  $1510 \pm 80$  B.P. ( $\delta^{13}\text{C} = -20.1$  ‰; Beta-102151, see Appendix A).

The 130-cm-thick profile of Backhoe Trench 2 is very similar, consisting of very dark gray loamy Ford alluvium with an inset gravel bed. Two soils (A-Cu-2Ab-2C profile) have formed on this fill.

The gravelly basal deposits and the radiocarbon age ( $1510 \pm 80$  B.P.) obtained from the buried A horizon in Backhoe Trench 1 are points of contention. The radiocarbon age suggests that the sediments represent the upper West Range alluvium defined by Nordt (1992:75–76); however, the gravelly nature of the deposit is more characteristic of the lower West Range member. The fine-grained upper West Range member, generally deposited between 2800 and 600 B.P., was not identified in the House Creek valley by Nordt (1992:39). It is believed to be absent for the most part, although Nordt (1992:39, 66) suggests that it may occur as small buried remnants; he also states that the deposition of the

gravelly, braided lower West Range was ongoing as late 2000 B.P. on House Creek and as late as 1700 B.P. in other small stream valleys. A series of radiocarbon assays at site 41CV1275, which is on the opposite side of House Creek from site 41CV1308, supports the late cessation of lower West Range alluviation. The radiocarbon age from Backhoe Trench 1 suggests that the period of lower West Range deposition continued even later in time, ceasing around 1500 B.P. The temporal overlap between the upper and lower West Range members within the stream valleys of Fort Hood is common, a phenomenon Nordt (1992:66) attributes to the size of the drainage basin. Late ages for the terminus of lower West Range deposition are more common in the

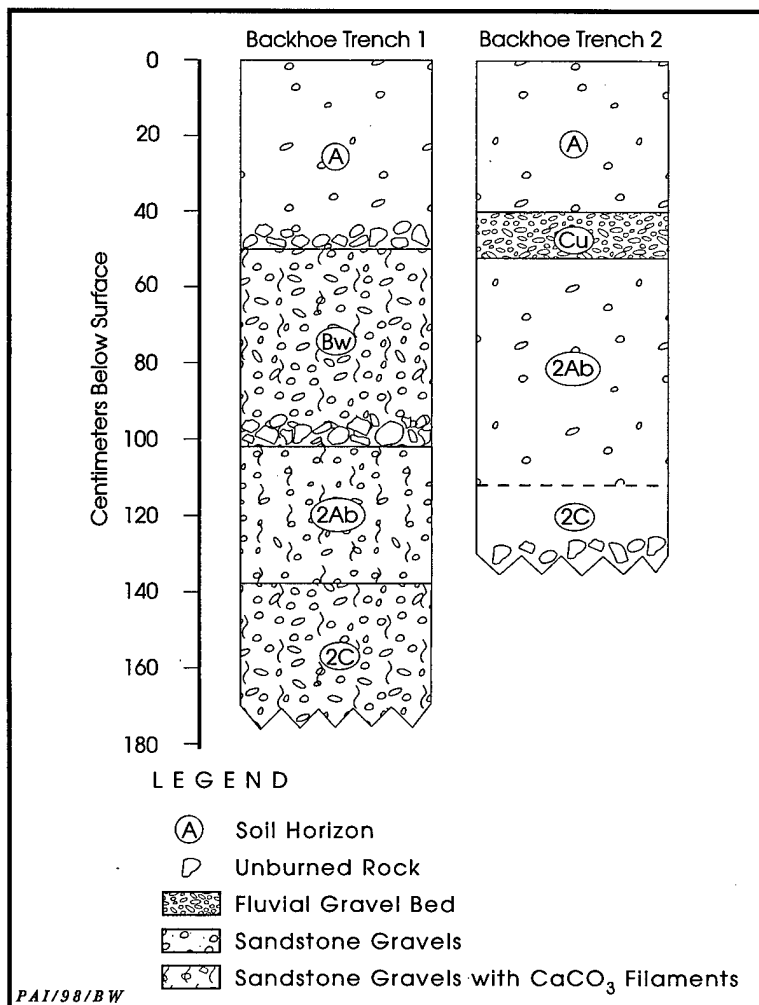


Figure 93. Profiles of Backhoe Trenches 1 and 2, 41CV1308.

smaller stream valleys than in the larger valleys, like Cowhouse Creek.

alluvial gravels.

### **Cultural Materials**

Artifact recovery was minimal in Test Unit 1. A total of 10 flakes, 1 biface, 1 multifunctional tool (graver and edge-modified flake), and 6 small burned rocks were found sporadically from 30–160 cm. Although a metal can was found at 120–130 cm, it probably washed into the unit from the previous day's rain. Of note, all of the excavated matrix contained high volumes of

### **Discussion**

Low frequencies of lithic debitage and burned rocks were the only cultural materials recovered during the current investigation. Within Test Unit 1, the few artifacts were fairly evenly distributed in the majority of levels from 30–160 cm. No features, organic materials, or subsistence remains were discovered. Therefore, Subarea B of 41CV1308 has extremely limited research potential.

# RESULTS OF TESTING AT COWHOUSE, TABLE ROCK, AND COTTONWOOD CREEK SITES

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and Douglas K. Boyd*

8

This chapter describes the results of the 1996 archeological testing at eight sites located along Cowhouse, Table Rock, and Cottonwood Creeks in the western portion of Fort Hood (see Figure 2 and Table 3). A total of 33 backhoe trenches and 29 test units (342 levels) were excavated at these sites, and 10 analysis units are defined (Table 42).

## 41CV1012

### Site Setting

Site 41CV1012 is bisected from west to east by Cottonwood Creek (Figure 94). The site is situated on an erosional slope north of the creek and on a series of terraces south of the creek. With the exception of a few large live oak and juniper trees, the northern portion of the site is open and covered with grasses. Vegetation on the terraces south of the creek consists of clusters of live oak, cedar elm, and juniper trees which are separated by open grassy areas. A major tank trail parallels the eastern site boundary, and the majority of the open areas of the site have been

impacted by vehicular traffic and sheet erosion. Site elevation is 270 m above mean sea level.

### Previous Work

This site was initially recorded by Kooren and Mesrobian (Texas A&M University) on 10 February 1986. Site dimensions were defined as 340 m north-south by 190 m east-west. Two burned rock middens were found on opposite sides of Cottonwood Creek, and burned rock scatters with associated lithic artifacts were observed. Two Marshall points and an untyped dart point were surface collected from the erosional slope north of Cottonwood Creek, and a low-density scatter of burned rocks, flakes, and unifaces was noted throughout the site. The site was considered to be 45 percent disturbed by tracked vehicles and erosion.

Turpin and Frederick (Mariah Associates) revisited and reevaluated the site on 2 November 1992. At this time, the site was divided into Subarea A, the erosional slope north of Cottonwood Creek, and Subarea B, the alluvial terraces south

**Table 42. Summary of analysis units defined at Cowhouse-Table Rock-Cottonwood Creek sites**

Site Number	Subarea Tested	Analysis Unit	Analysis Unit Setting
41CV1012	B	1	terrace (T <sub>1</sub> )
41CV1030	—	1	terrace (T <sub>1</sub> )
		2	terrace (T <sub>0</sub> )
41CV1048	C	1	toeslope/terrace (T <sub>1</sub> )
41CV1120	—	1	terrace (T <sub>1</sub> )
41CV1122	A, B	1	toeslope/terrace (T <sub>1</sub> ), upper deposits
		2	terrace (T <sub>1</sub> ), lower deposits
41CV1133	—	1	terrace (T <sub>1</sub> )
41CV1137	B	1	terrace (T <sub>1</sub> )
41CV1206	C	1	toeslope/terrace (T <sub>1</sub> )

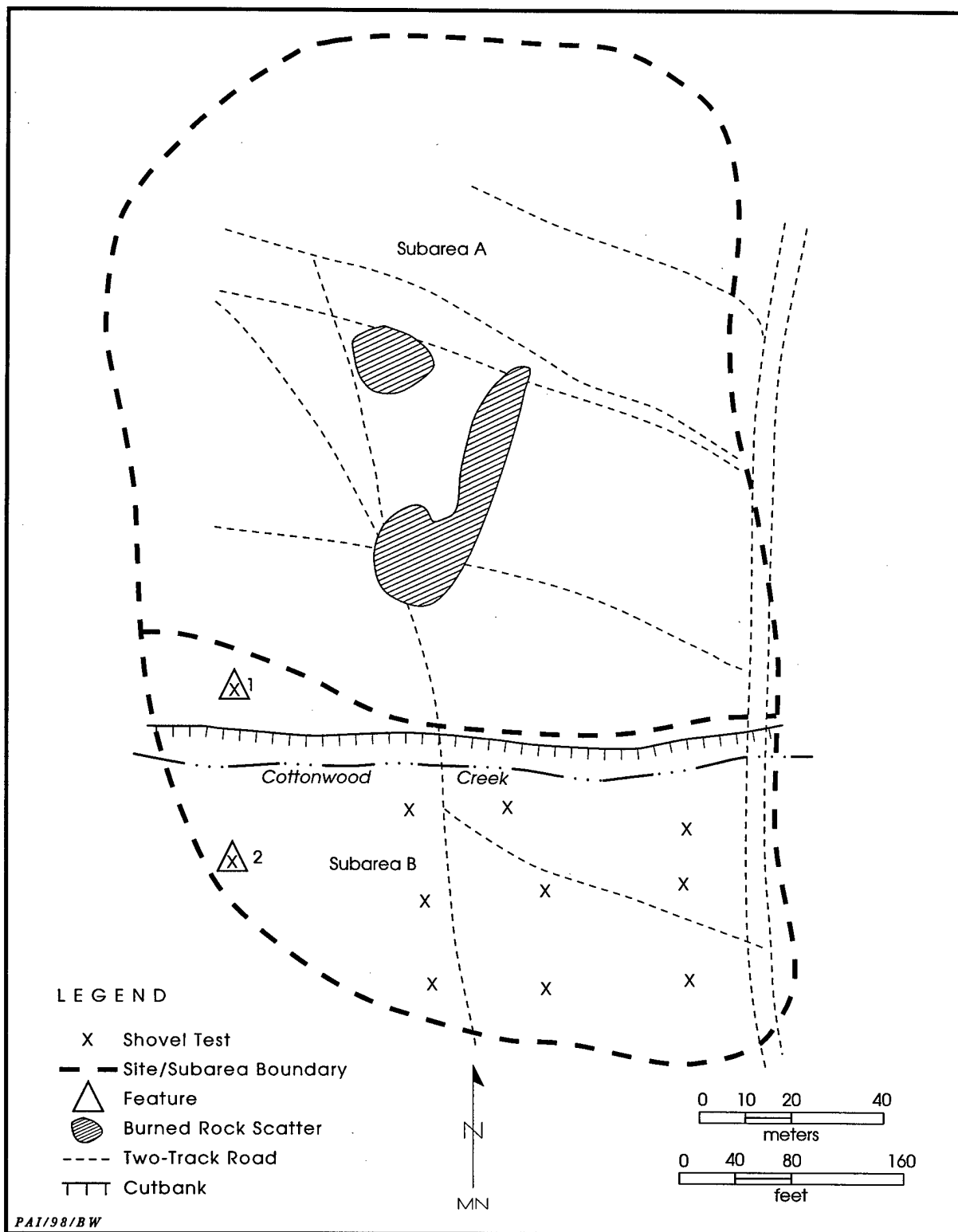


Figure 94. Site map, 41CV1012 (modified from Trierweiler, ed. 1994:A1161).

of the creek. Site dimensions were reduced to 300 m north-south by 180 m east-west. Subarea A was observed to be underlain by Glen Rose limestone and exhibited an A-Bk-R or truncated B-R profile. This surface was estimated to range from 4 to 15 m above the channel, and it abutted the creek as a limestone scarp. The burned rock midden previously identified in this portion of the site was re-located and was designated Feature 1. This feature measured 15 m in diameter and was minimally disturbed by erosion and vehicle traffic. Excluding Feature 1, the remainder of Subarea A was extensively disturbed and was evaluated as having little potential for intact cultural deposits.

Subarea B consisted of  $T_0$  and  $T_1$  surfaces on the south side of Cottonwood Creek, estimated to lie 0–1.5 and 2.5–3 m above the channel floor, respectively. The  $T_1$  surface was thought to be underlain by West Range deposits consisting of a cumulic, dark brown to black clayey alluvium. A thin veneer of West Range fill (<50 cm thick) was observed to drape a shallow bedrock strath present near the southern edge of the site. A thin veneer of sandy Ford alluvium also was observed inset into and draping the leading edge of this  $T_1$  surface. The burned rock midden previously identified in this area was re-located and designated Feature 2. Measuring 15x10 m, this midden was impacted by vehicle traffic and subsequent erosion. Since all of Subarea B had potential for buried cultural deposits, shovel testing was recommended. For site management purposes, Feature 1 (although north of the creek) was subsumed into Subarea B based on its potential to contain intact deposits.

On 11 December 1992, a crew excavated 11 shovel tests in Subarea B, but all were negative. A single shovel test placed in Feature 1 yielded approximately 60 burned rocks from 0–48 cm. Burned rock densities decreased with depth, and excavation was halted by large rocks or bedrock. The investigators concluded that only Feature 1 had the potential to contain intact cultural deposits of unknown significance. A minimum testing effort of 1–2 m<sup>2</sup> of manually excavated test units was recommended to determine the National Register eligibility of Feature 1 in Subarea B (Trierweiler 1994:A1160–A1162).

#### **Work Performed**

On 21 May 1996, Prewitt and Associates

completed formal testing of Feature 1 in Subarea B of 41CV1012. Two 1x1-m test units were excavated. A total of 1.1 m<sup>3</sup> was manually dug.

Test Unit 1 was placed on Feature 1 and excavated to bedrock at 40 cm. Test Unit 2, excavated to dense gravels at 70 cm, was placed approximately 10 m upslope (north) of Feature 1. The test units were oriented to magnetic north. The profile of Test Unit 2 was recorded in detail to assess soil geomorphology.

#### **Site Extent and Depth**

Although this is a fairly extensive site, current investigations were limited to the northernmost portion of Subarea B, north of Cottonwood Creek, that contains Feature 1 (Figure 95). Cultural artifacts were found at 0–30 cm in Test Unit 1 and at 0–10 cm in Test Unit 2 within this 30x55-m area.

#### **Sediments and Stratigraphy**

The profile of Test Unit 2 (see Appendix B) suggests that a thin mantle (0–60 cm) of dark brown loamy West Range alluvium (Nordt 1992) extends north of Cottonwood Creek, draping a bedrock strath 2–3 m above the channel. A thick, cumulic soil (A-Bw-Bw2) has formed on this deposit.

#### **Cultural Materials**

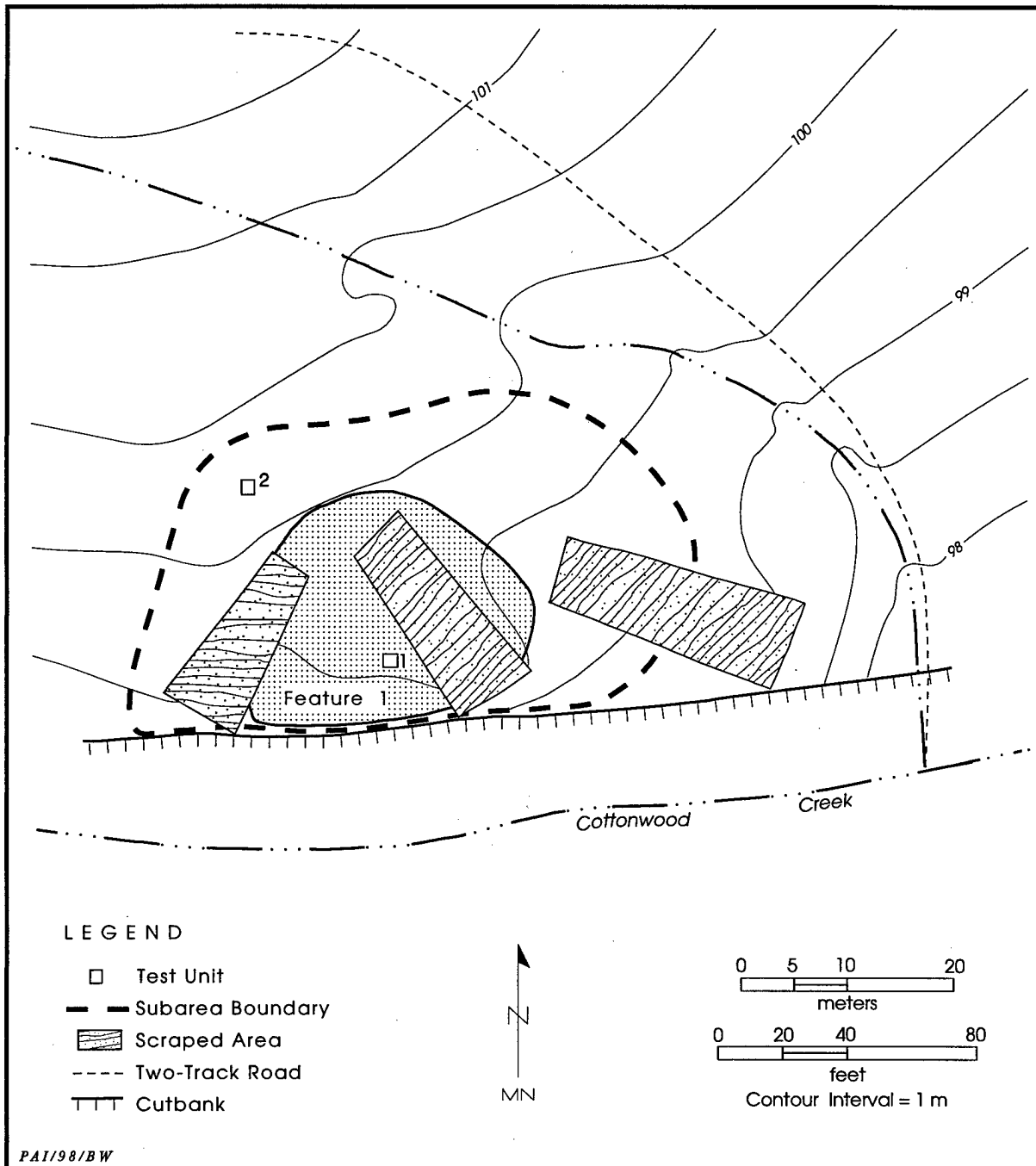
Few artifacts were recovered from each unit, including 16 flakes and 10 burned rocks from Test Unit 1 and 1 flake and 3 burned rocks from Test Unit 2. No subsistence or datable remains were discovered.

#### **Cultural Feature**

During the current investigation, Feature 1 was observed to have been virtually destroyed by heavy machinery, earthmoving/scraping activities, tank traffic, and erosion. The feature has been scattered across a 28x21-m area, with most of the burned rocks having been pushed to the edge of and into the north side of Cottonwood Creek.

#### **Discussion**

Although low frequencies of lithic debitage



**Figure 95.** Map of area of Subarea B containing Feature 1, 41CV1012.

and burned rocks were recovered during the present investigation, they were found in a disturbed archeological context. Although Feature 1 was previously described as a circular accumulation of burned rocks (i.e., midden), as a result of military impacts it currently resembles no

more than a surface scatter of burned rocks. Due to the severity of disturbance, it is unlikely that Feature 1 has any intact deposits remaining. Subarea B of 41CV1012 is recommended as not eligible for listing in the National Register of Historic Places (NRHP).

### **41CV1030**

#### **Site Setting**

Downstream from the confluence of Cowhouse and Table Rock Creeks, site 41CV1030 is situated on the west bank of Cowhouse Creek. This large site is long and narrow and encompasses a road paralleling Cowhouse Creek its entire length. Along the margins of the cutbank and adjacent to a stone wall remnant perpendicular to the creek, vegetation consists of pecan, oak, and cedar elm trees. The remainder of the site area is open and covered with grasses. Disturbances include vegetation clearing, probable cultivation, a road, and military activity (particularly evidenced by huldowns). Site elevation is 230 m above mean sea level.

#### **Previous Work**

On 9 May 1985, Drollinger and Strychalski (Texas A&M University) recorded this large site as measuring 900x100 m. Mussel shells, burned rocks, debitage, bifaces, and unifacial tools were exposed along road cuts and tank crossings of Cowhouse Creek. One untyped dart point was collected. An estimated 40 percent of the site was impacted by tracked vehicles, roads, and erosion.

On 22 September 1992, Abbott and Kleinbach (Mariah Associates) revisited the site and slightly expanded its size to 1,000x100 m. The site consisted of a long expanse of the principal terrace surface of Cowhouse Creek and a narrow inset surface adjacent to the stream. The principal terrace was approximately 12 m above the modern channel, with exposures confined to military excavations and a few locations along the cutbank. The upper sediments consisted of a massive to weak granular structure, dark grayish brown silty loam A horizon approximately 70 cm thick. This was underlain by a weak to moderately subangular blocky, grayish brown silty loam Bk horizon, ca. 80 cm thick and containing few to common fine carbonate filaments. Below this was a massive, grayish brown to tan silty loam Cox horizon. Due to the limited exposure, the age of the principal terrace fill (or fills) was unknown. It was thought to represent middle to late Holocene sediments, either the West Range or Fort Hood alluvial units (Nordt 1992). The inset surface, correlating to the Ford alluvium (Nordt 1992), was underlain by a thick,

gravelly sequence of channel deposits from an earlier phase of aggradation. Cultural materials observed on the surface included a very light scatter of burned rocks and flakes on the road paralleling the creek. At approximately 40 cm, a burned rock concentration (3x2 m) was exposed between two huldowns. Site disturbances included vegetation clearing, probable cultivation, roads, and military maneuvers. Since the site had the potential for buried cultural deposits, shovel testing was recommended.

On 5–7 October 1992, a crew excavated 69 shovel tests. One-fourth of the shovel tests ( $n = 17$ ) contained prehistoric cultural materials from 0–40 cm, with none producing more than three artifacts. Other shovel tests contained recent or historic items at 0–40 cm, indicating that disturbances had impacted some portions of the site. Although sparse prehistoric cultural materials were recovered, the site had the potential to contain intact deposits of unknown significance below the level of shovel testing. The recommended testing effort included a minimum of 10 backhoe trenches and 8–12 m<sup>2</sup> of manually excavated test units to determine NRHP eligibility (Trierweiler, ed. 1994:A1176–A1179).

#### **Work Performed**

From May through June 1996, Prewitt and Associates conducted formal testing of site 41CV1030 (Figures 96 and 97). The test excavations included 13 backhoe trenches (Backhoe Trenches 1–13) and 10 manually excavated test units (Test Units 1–10) scattered across this 1-km-long site. One unit measured 1x1 m, five had dimensions of 1.0x0.5 m, and the remaining four were 0.5x0.5 m. Each unit was terminated at an arbitrary depth, with a total of 4.65 m<sup>3</sup> manually excavated. In January 1998, two additional backhoe trenches were excavated to search for buried features in the northern end of the site.

Nine backhoe trenches (Backhoe Trenches 1–9) were excavated perpendicular to Cowhouse Creek across the entire expanse of the T<sub>1</sub> surface. These trenches were 1.5 m wide and ranged from 11 to 20 m long and 3.5 to 4.3 m deep. Backhoe Trenches 4, 5, and 6 contained sparse prehistoric cultural materials in the upper 40 cm of fill. At the east end of Backhoe Trench 9, a few burned rocks were exposed at approximately 100 and 210 cm. All of the other trenches were

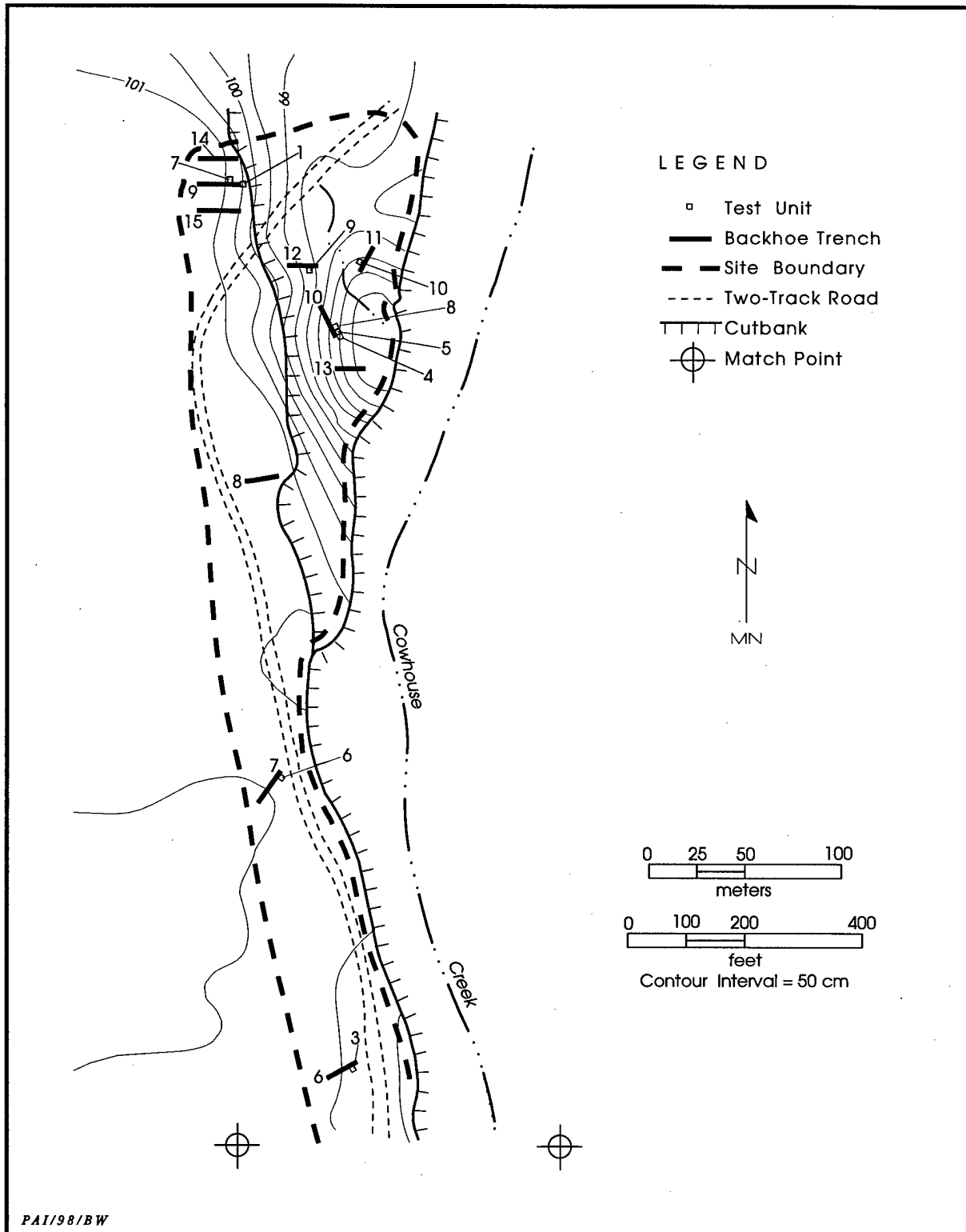


Figure 96. Map of north half of 41CV1030.



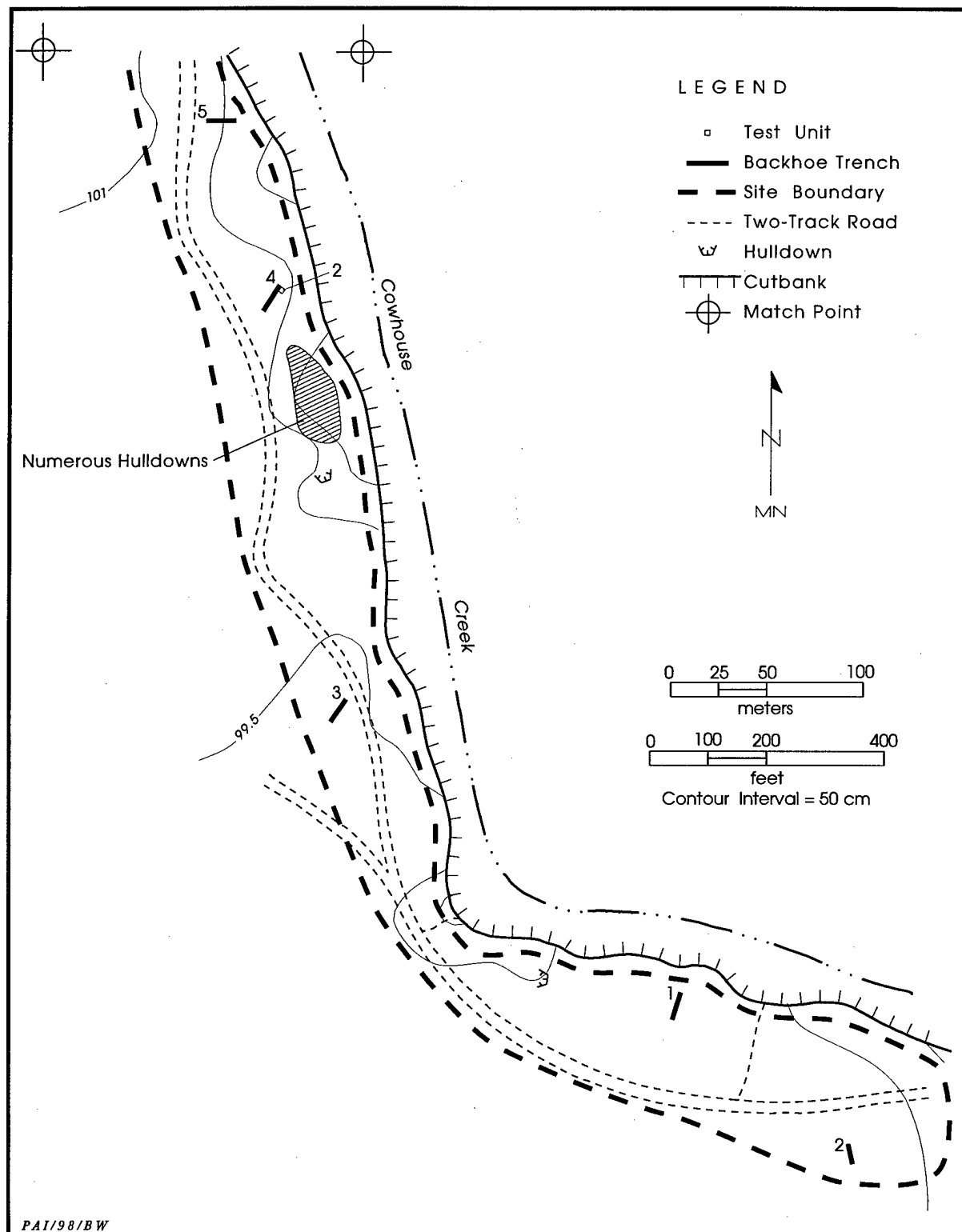


Figure 97. Map of south half of 41CV1030.

culturally sterile. In addition, some trenches exposed up to 40 cm of disturbed deposits containing recent and historic items.

Five test units were also placed on the higher ( $T_1$ ) terrace. Excavated to 120 cm, Test Unit 1 (1x1 m) was placed at the east end of Backhoe Trench 9 above the burned rocks exposed at approximately 100 cm. Test Unit 2 (0.5x0.5 m) was excavated to 150 cm along the east wall of Backhoe Trench 4. Excavated to 220 cm, Test Units 3 and 6 (both 0.5x0.5 m) were located at the east end of Backhoe Trench 6 and adjacent to the northeast corner of Backhoe Trench 7, respectively. Placed on the safety bench of Backhoe Trench 9, Test Unit 7 (1.0x0.5 m) was situated above a few burned rocks exposed at 210 cm in the trench wall and excavated to 310 cm. Because the upper 120 cm of fill was removed during trenching, the excavation began at Level 13 (120–130 cm).

Backhoe Trenches 10–13 were excavated on the lower terrace ( $T_0$ ) at the northeastern site margin. These four trenches measured 12–20 m long, 1.5 m wide, and 3.3–4.0 m deep. Three trenches were oriented northwest-southeast, and the fourth northeast-southwest. Backhoe Trenches 11, 12, and 13 were culturally sterile. Charcoal flecking was exposed in the east wall of Backhoe Trench 10 at 115–120 cm; a flotation sample was collected from this area of the trench at 116 cm. Although not submitted for analysis, this processed sample contained abundant charred wood. Also, some burned rocks and charcoal were exposed at approximately 160 cm in the east wall of Backhoe Trench 10.

Five test units were situated on the  $T_0$  surface. Excavated to 110 cm, Test Unit 4 (0.5x0.5 m) was placed adjacent to the southeast corner of Backhoe Trench 10. Contiguous with (north of) Test Unit 4, Test Unit 5 (1.0x0.5 m) was located on the safety bench of Backhoe Trench 10 above the burned rocks and charcoal exposed in the profile. The matrix from the surface to a maximum depth of 114 cm was removed during trenching; therefore, the excavation began at Level 12 (110–120 cm). A burned rock concentration (Feature 1) was exposed from 130–141 cm, and the excavation was terminated at 160 cm. Placed on the safety bench of Backhoe Trench 10, Test Unit 8 (1.0x0.5 m) was directly north of and contiguous with Test Unit 5. Since trenching had removed the upper portions of the deposit, the excavation started with Level 15

(140–150 cm) and was halted at 180 cm. Test Units 9 and 10 (both measuring 1.0x0.5 m) were placed on the safety benches of Backhoe Trenches 12 and 11, respectively. Excavation of both units began with Level 14 (130–140 cm) due to removal of the upper sediments during trenching, and both were terminated at 160 cm.

Approximately a year and a half after the nine trenches and five test units were excavated on the  $T_1$  surface, Backhoe Trenches 14 and 15 were excavated in the immediate vicinity of Backhoe Trench 9 and Test Unit 7. A review of the site records during analysis suggested that an ephemeral concentration of flakes encountered from 190–210 cm below surface warranted additional effort. Backhoe Trench 14 (15 m long and 2.7 m deep) was excavated 10 m north of and parallel to Backhoe Trench 9, while Backhoe Trench 15 (15 m long and 2.6 m deep) was excavated 10 m south of and parallel to Backhoe Trench 9. An examination of the trench profiles revealed some mussel shell fragments at the target depth; however, no flakes, artifacts, features, or hint of a cultural zone were observed.

### **Site Extent and Depth**

The alluvial terraces containing site 41CV1030 are delimited by Cowhouse Creek to the east, but extend unknown distances to the north, west, and south. Based on the previous investigations, extent of surficial cultural materials, and the testing results, the estimated site size of 1,000x100 m remains unchanged from the site dimensions defined in 1992. Within the higher terrace ( $T_1$ ), no isolable, subsurface cultural deposits were encountered. Ephemeral cultural deposits, represented by Features 1 and 2 (burned rock concentrations), are buried in the lower terrace ( $T_0$ ) at 130–141 and 146–163 cm, respectively.

### **Definition of Analysis Units**

Based on the presence of different geomorphic surfaces and corresponding alluvial units, two analysis units are defined. Yielding no distinguishable intact cultural deposits, the  $T_1$  surface consisting of the upper West Range alluvium corresponds to Analysis Unit 1. Containing diffuse cultural deposits, the Ford alluvium present in the  $T_0$  correlates to Analysis Unit 2.

### Analysis Unit 1

Analysis Unit 1 was encountered in 11 backhoe trenches and 5 test units located on the T<sub>1</sub> surface. This analysis unit consists of the upper West Range alluvium encountered from the surface to a maximum depth of 4.3 m.

#### *Sediments and Stratigraphy*

Three of the 11 trench profiles were described and soil geomorphology was assessed (see Appendix B). The 386-cm-thick profile of Backhoe Trench 4 consists of late Holocene upper West Range dark brown silty clay loam and yellowish brown clay loam alluvium imprinted with an A-Bwk-Bw-C soil. Backhoe Trenches 6 and 9 revealed similar profiles of upper West Range alluvium imprinted with A-Bwk-Bwk2-C-C2 (0–330 cm) and A-Bwk-C (0–324 cm) soils, respectively. All three trench profiles suggest that the upper West Range component of the T<sub>1</sub> terrace aggraded rapidly through fine-grained overbank deposition.

#### *Cultural Materials*

Three of the five test units yielded cultural materials (Table 43). In Test Unit 1, 4 of 12 levels contained cultural materials. Four flakes, 3 miscellaneous unifaces, 1 side scraper, and 2 small burned rocks were found at 0–30 cm. Level 10 (90–100 cm) yielded 4 burned rocks (1 kg). Three (13.6 percent) out of 22 levels excavated in Test Unit 3 produced 2 flakes and 7 burned rocks. Test Unit 7 yielded the greatest number of cultural items, including 14 flakes, 15 pebble-sized burned rocks, and an unmodified mussel shell at 180–230 cm. Test Units 2 and 6 were culturally sterile.

#### *Discussion*

Three of five test units contained sparse cultural

materials. Although the depositional environment of this analysis unit (a thick layer of upper West Range alluvium) is an ideal situation for the preservation of stratigraphically discrete components, the archeological remains that are present are extremely diffuse. In the most promising area, a few flakes seemed to be concentrated from 190–210 cm in Test Unit 7. However, even this concentration was very ephemeral, and no definable cultural stratigraphy or features were encountered in Test Unit 7 or in the three trenches (Backhoe Trenches 9, 14, and 15) within 15 m of this unit. Given the paucity of cultural materials, isolation and interpretation of cultural components in this area is tenuous at best.

### Analysis Unit 2

Four backhoe trenches and five test units were placed on the T<sub>0</sub> surface. The Ford alluvium, encountered in these excavations from the surface to a maximum depth of 4 m, defines Analysis Unit 2.

**Table 43. Summary of cultural materials from 41CV1030, Analysis Unit 1**

Provenience	Side Scraper	Miscellaneous Unifaces	Unmodified Debitage	Unmodified Shell	Totals
<b>TEST UNIT 1</b>					
Level 1 (0–10 cm)	1	1	1	–	3
Level 2 (10–20 cm)	–	2	2	–	4
Level 3 (20–30 cm)	–	–	1	–	1
Subtotals	1	3	4	0	8
<b>TEST UNIT 3</b>					
Level 3 (20–30 cm)	–	–	1	–	1
Level 14 (130–140 cm)	–	–	1	–	1
Subtotals	0	0	2	0	2
<b>TEST UNIT 7</b>					
Level 19 (180–190 cm)	–	–	2	–	2
Level 20 (190–200 cm)	–	–	4	–	4
Level 21 (200–210 cm)	–	–	5	1	6
Level 22 (210–220 cm)	–	–	1	–	1
Level 23 (220–230 cm)	–	–	2	–	2
Subtotals	0	0	14	1	15
Totals	1	3	20	1	25

### **Sediments and Stratigraphy**

Three of four trench profiles revealed an inset fill of sandy to loamy late Holocene Ford alluvium imprinted with several soils (see Appendix B). Backhoe Trench 10 exposed a 76-cm-thick dark grayish brown to very dark grayish brown cumulic soil. Two other buried soils (2AC and 3Ab-3Bwb profiles) are present within the 273-cm-thick profile. Backhoe Trenches 11 and 13 are mantled by 22- and 37-cm-thick sandy deposits, respectively, probably due to the December 1991 flood. Two buried soils (2Ab and 3Ab profiles), formed in dark gray to very dark grayish brown silty clay loam sediments, are present in the 276-cm-thick profile of Backhoe Trench 11. Two buried soils (AC and 2Ab-2Bwb profiles) also were observed in the 386-cm-thick profile of Backhoe Trench 13.

### **Cultural Materials**

Test Units 4, 9, and 10 did not yield any cultural materials. Although Test Units 5 and 8 contained burned rock features, no other cultural remains were found in these excavations.

### **Cultural Features**

Feature 1 (a burned rock concentration) was encountered from 130–141 cm in Test Unit 5. The feature consisted of a single layer of 105 horizontally laid burned rocks (6.5 kg). Approximately 40 of these were angular, with the largest burned rock being 9x8x4 cm in size. The remainder consisted of pebble-sized fragments. The maximum excavated dimensions were 75 cm north-south by 50 cm east-west. No burned rocks were exposed in the opposite (west) wall of Backhoe Trench 10; however, rocks visible in the east wall of Test Unit 5 suggested that the feature continued in this direction. No artifacts were found in the feature fill or surrounding matrix. Although not submitted for macrobotanical analysis, a processed flotation sample contained a low frequency of charred wood.

In Test Unit 8, Feature 2 (a burned rock concentration) was encountered from 146–163 cm. The feature consisted of a single layer of horizontally laid burned rocks with maximum excavated dimensions of 40 cm east-west by 32 cm north-south. Most of the burned rocks were concentrated in the center of the test unit, with the

remainder along and extending into the east wall profile. The burned rocks were primarily subrounded and blocky angular pieces, but numerous pebble-sized fragments were also present ( $n = 47$ , 9.5 kg). The burned rocks ranged in size from 10x10x5 cm to 1x1x1 cm. Neither the feature nor the surrounding matrix yielded any cultural materials. Charcoal collected at 146–160 cm was identified as *Celtis laevigata* and yielded a radiocarbon age of  $160 \pm 60$  B.P. (Beta-102109, see Appendixes A and E).

### **Discussion**

Two burned rock concentrations were encountered in adjacent test units but no artifacts were associated. Although separated by approximately 25 cm horizontally and 5 cm vertically, they are most likely associated. A calibrated charcoal radiocarbon date of A.D. 1655 (1680, 1745, 1805, 1935) 1950 was obtained on Feature 2 charcoal (see Appendix A), suggesting that the deposit correlates to the prehistoric/historic period.

### **Summary and Conclusions**

At site 41CV1030, the paucity of cultural materials buried in the upper terrace ( $T_1$ ) reveals that definable cultural components are not present. Two burned rock concentrations (Features 1 and 2) encountered in the lower terrace ( $T_0$ ) appear to be vertically isolable, but are nondescript and ephemeral in horizontal extent, with no associated prehistoric cultural materials. A calibrated radiocarbon date on charred hackberry wood indicates a time span of A.D. 1655–1950 for one feature. Thus, the age and contextual integrity of this burned rock concentration are uncertain at best. The cultural deposits in the lower terrace may represent historic or recent activities, or earlier materials redeposited or reworked during historic times. Based on the absence of intact and interpretable deposits, 41CV1030 is considered to have low research potential and is recommended as not eligible for listing in the NRHP.

### **41CV1048**

#### **Site Setting**

Site 41CV1048 encompasses an upland surface, a lower bench, and a narrow tributary valley (Figure 98). Located about 200 m west of

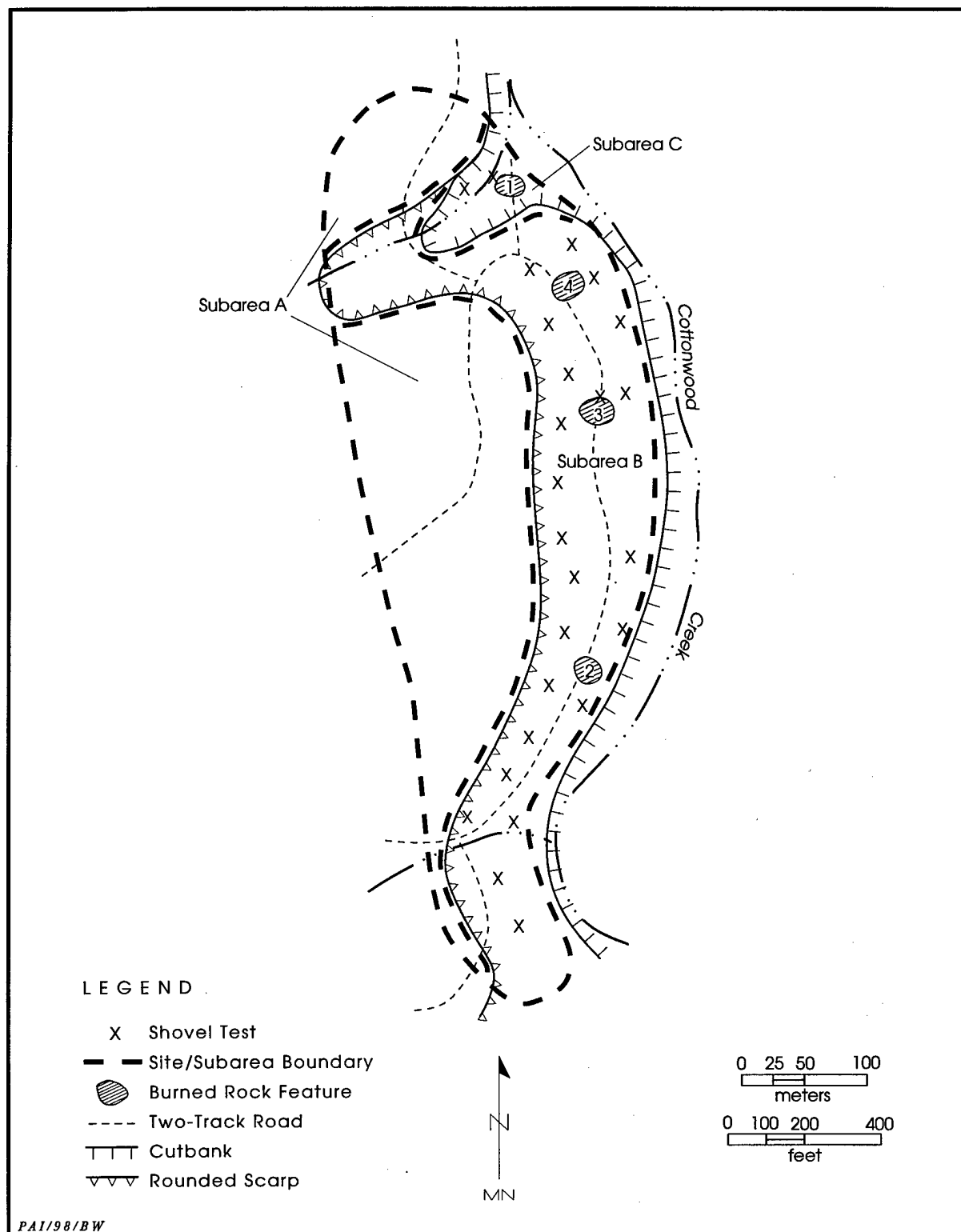


Figure 98. Site map, 41CV1048 (modified from Trierweiler, ed. 1994:A1195).

a major tank trail, the site is bounded by Cottonwood Creek on the east and bisected by unnamed tributaries near the north and south site margins. A road crosses the site approximately 50 m west of, and parallel to, Cottonwood Creek. In addition, several east-west roads bisect the site area. The vegetation consists of an open to dense oak-juniper woodland with a thick understory. The site is 250–260 m above mean sea level.

### **Previous Work**

On 22 May 1985, M. Masson and Drollinger (Texas A&M University) recorded the site as an intensively occupied camp containing widespread and dense amounts of burned rocks and associated lithic artifacts. Three burned rock mounds (designated Mounds A, B, and C) were noted on the upland surface in the northern half of the site. Maximum site dimensions were 800x275 m, and an estimated 20 percent of the site was disturbed by erosion and vehicular traffic. For management purposes, the site was later classified as a lithic resource procurement area (LRPA).

On 9 December 1992, Mehalchick and Abbott (Mariah Associates) revisited the site. This large site was situated on a stepped limestone surface underlain by alternating beds of resistant and easily weathered limestones of the Glen Rose formation. Two wide, soil-mantled bedrock benches were present; they were separated by a round scarp several meters high. At the north end of the site, a northwest-flowing tributary falls several meters into a short, deep, headward-cutting canyon that probably marked a spring discharge locality. Based on the areal extent of cultural materials, the overall site dimensions were slightly reduced to 700x200 m. The site was divided into three subareas due to the different geomorphic contexts and corresponding archeological potentials.

Subarea A encompassed the highest bench on the site and the rounded scarp that extended to the lower bench. A relatively thick, residual clay soil characterized by an A-Bt-R profile was present. The A horizon consisted of a black stony clay which graded into a reddish brown Bt horizon that rested on relatively intact limestone. The subarea was severely impacted by tracked vehicles, sheet erosion, and bioturbation. Scattered lithic artifacts and dense amounts of

burned rocks were noted across the surface. The previously recorded "burned rock mound A" was re-located but had been severely impacted and reduced to a 6x5-m burned rock scatter. "Burned rock mound C" was not re-located. This feature was originally mapped in the middle of a tank trail, and may have been subsequently destroyed by military activity. Due to the lack of appreciable Holocene sedimentation and the negligible potential for intact cultural deposits, no further work was warranted in Subarea A.

Subarea B occupied the lower bench and has a similar, but generally thicker, soil mantle. This matrix probably included sediments derived from in situ weathering, slope wash from the higher bench, and alluvial deposits from a small, steep tributary in the southern part of the site and possibly Cottonwood Creek. In some locations, up to 30 cm of Holocene sediment appeared to have been deposited, resulting in the obviously overthickened A horizon. At the southern site margin, a considerable quantity of fine sands had spread out over the southern part of the bench and had been incorporated into the soil, giving it a sandy clay loam texture. This was due to a small tributary that drained an upslope outcrop of Paluxy sand. The surface was moderately affected by tracked vehicles and bioturbation.

A light scatter of debitage and burned rocks was observed across Subarea B. Three features, all located in or along the same tank trail, were identified. Features 2 and 4, burned rock middens, measured 7x5 m and 8x4 m, respectively. Feature 3, a burned rock concentration located between Features 2 and 4, had maximum dimensions of 2x1 m. An accumulation of burned rocks and flakes was noted at the southernmost end of the same tank trail, and a Scallorn point was collected from this area. Due to the potential for intact cultural materials, shovel testing was recommended for Subarea B.

Subarea C consisted of a small wedge of alluvium in the short, notchlike tributary canyon at the northern site boundary. A single alluvial fill graded rapidly from limestone gravels into a black clay loam, exhibiting an A-C profile approximately 1.5 m thick. The lack of apparent soil development suggests that this alluvium is probably no more than 1,000 to 2,000 years old. Erosion and a tank trail had minimally impacted the subarea. Previously recorded "burned rock mound B" was re-located and designated Feature 1, a burned rock midden measuring 6x2.5 m. Based

on the potential for intact cultural deposits, shovel testing was recommended.

On 22 December 1992, a crew excavated 23 shovel tests in Subarea B and two in Subarea C. Only five of the shovel tests in Subarea B (21.7 percent) were positive. All five were excavated adjacent to Features 2, 3, or 4, and yielded either sparse cultural materials or exhibited evidence of disturbance. Based on the low archeological potential, no further work was recommended for Subarea B.

Placed on Feature 1, the two shovel tests in Subarea C encountered dense amounts of burned rocks at 0–35 cm. Both tests were arbitrarily terminated, with neither reaching the base of the midden. These results indicated that Subarea C had potential for intact cultural deposits that might be eligible for listing in the NRHP. The recommended testing effort included 2–3 m<sup>2</sup> of manually excavated test units (Trierweiler, ed. 1994:A1194–A1197).

Because site 41CV1048 was classified as a lithic resource procurement area (LRPA), Abbott and Kleinbach (Mariah Associates) revisited the site on 7 June 1993 to evaluate Subarea A for its potential to address questions of lithic procurement and reduction. No naturally occurring chert was observed, and the site was excluded from resurvey.

### Work Performed

On 25 June 1996, Prewitt and Associates completed formal testing of Subarea C at 41CV1048 (Figure 99). Feature 1 was re-located due to its exposure in and along a tank trail. The test excavations included two backhoe trenches (Backhoe Trenches 1–2) and three 1x1-m test units (Test Units 1–3). A total of 2.8 m<sup>3</sup> was manually excavated.

Excavated west of the tank trail that exposed burned rocks associated with Feature 1, Backhoe Trench 1 was oriented to 110° and had maximum dimensions of 25.0x0.8x1.5 m. Visible the entire length of the trench, Feature 1 was exposed from the surface to a maximum depth of 70 cm. Backhoe Trench 2 was placed approximately 15 m east-northeast of Backhoe Trench 1 and east of the tank trail. The trench measured 12.0x0.8x1.9 m, was oriented to 85°, and did not encounter any cultural materials.

All of the test units were excavated to arbitrary depths. In order to sample a thick portion

of Feature 1, Test Unit 1 was placed along the south wall of Backhoe Trench 1 near the east end of the trench. Its excavation was terminated at 90 cm. Approximately 10 m southwest of Test Unit 1 and 5 m south of Backhoe Trench 1, Test Unit 2 was excavated to 90 cm on the upslope margin of the terrace (toeslope) in an attempt to define the horizontal extent of Feature 1. Excavated to 100 cm, Test Unit 3 was situated ca. 1 m beyond the east end of Backhoe Trench 2.

### Site Extent and Depth

The narrow tributary valley containing the Holocene terrace (T<sub>1</sub>) is clearly delimited on all sides. Beginning with the northern boundary and proceeding in a clockwise motion, the terrace is bounded by a spring-fed tributary, Cottonwood Creek and a recent low-lying floodplain (T<sub>0</sub>), a steep slope, and the deeply incised upstream section of the canyon which lacks any sediment. The entire site measures approximately 700 m north-south by 200 m east-west; the horizontal extent of Subarea C has maximum dimensions of 90 m east-west by 55 m north-south. The vertical extent of cultural deposits in Subarea C is represented by Feature 1 from 31–70 and 20–60 cm in Test Units 1 and 2, respectively.

### Sediments and Stratigraphy

The sediments and stratigraphy of site 41CV1048 were documented through the examination of two backhoe trench profiles (see Appendix B). Based on the degree of soil development and a radiocarbon assay from an encapsulated cultural feature, it is believed the alluvial fill at the site is middle to late Holocene in age (Figure 100). The 145-cm-thick profile of Backhoe Trench 1 consists of a dark, loamy to gravelly late Holocene alluvium (0–81 cm) overlying older deposits. The overlying alluvium is believed to correlate with the lower West Range alluvium of Nordt (1992) and is imprinted with an A-Bw soil. The 1A horizon is a black clay loam, while the Bw horizon is a brown to dark brown gravelly clay loam. The underlying older deposits (81–145+ cm), believed to correlate with the Fort Hood alluvium, consist of a light olive brown clay loam atop a clast-supported fluvial gravel bed.

The profile of Backhoe Trench 2 consists of

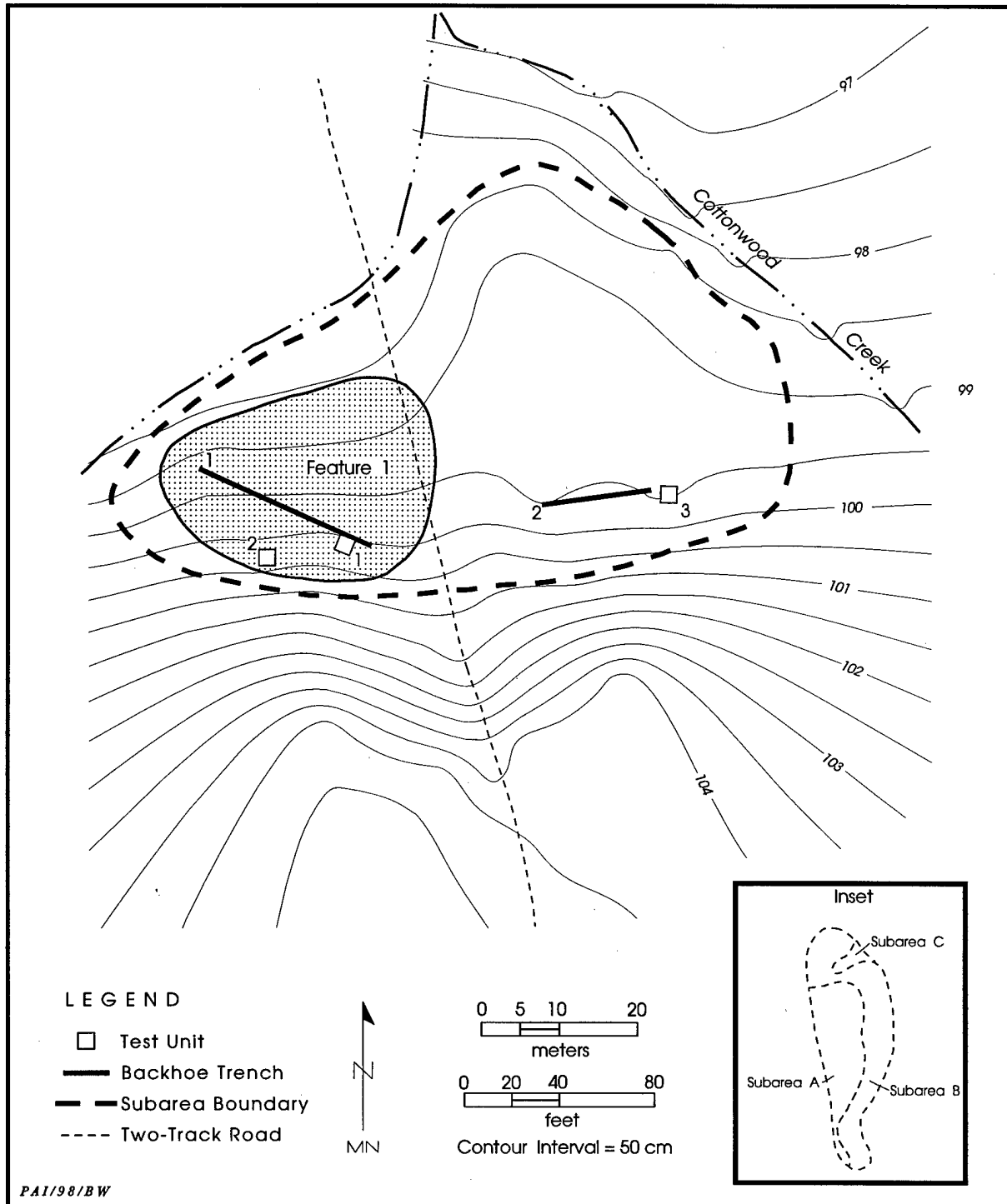


Figure 99. Map of Subarea C, 41CV1048.

an 82-cm-thick dark, loamy to gravelly alluvium of lower West Range alluvium. A cumelic soil (A1-A2-Bwk) is imprinted on this deposit. It over-

lies a dark gray gravelly clay and clast-supported fluvial gravel bed of Fort Hood alluvium (82-178+cm).



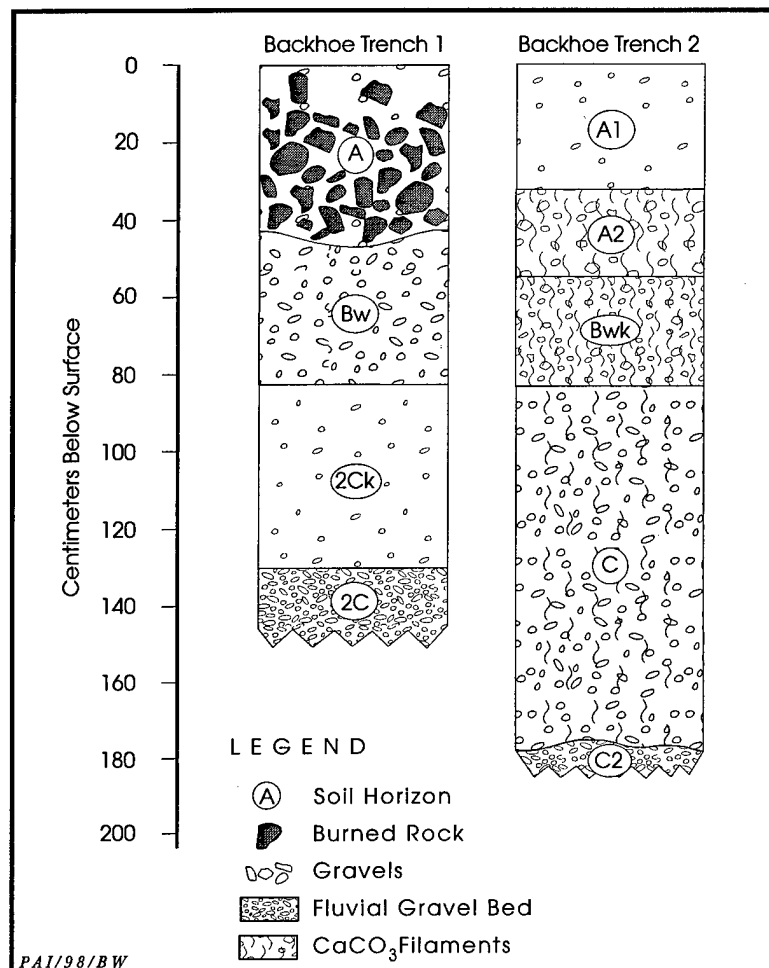


Figure 100. Profiles of Backhoe Trenches 1 and 2, 41CV1048.

### Cultural Materials

Most of the cultural materials recovered from Test Units 1 and 2 are associated with the burned rock midden, Feature 1. Only five of nine levels (55.6 percent) excavated in each of the two units consisted of nonfeature matrix. Nonfeature matrix above the midden produced 46 burned rocks (9.25 kg) and 3 flakes at 0–30 cm in Test Unit 1 and 11 burned rocks (1.25 kg), a miscellaneous uniface, and an aluminum can lid at 0–20 cm in Test Unit 2. Feature 1 matrix, from 31–70 cm in Test Unit 1 and 20–60 cm in Test Unit 2, produced 745 burned rocks (431.75 kg) and 3 flakes (see Cultural Feature below). Nonfeature matrix from below Feature 1 produced 33 burned rocks (18.5 kg) and 1 flake at 70–90 cm in Test Unit 1 and 48 burned rocks (23.5 kg) and 6 flakes

at 60–90 cm in Test Unit 2. The only cultural item found in Test Unit 3, excavated outside the midden, was a small burned rock at 0–10 cm.

### Cultural Feature

Feature 1 was encountered in Test Unit 1 from 31–70 cm. The excavated portion of the midden covered the entire unit at a thickness of approximately 39 cm; the ca. 0.4 m<sup>3</sup> of midden deposit contained approximately 450 burned rocks (207.25 kg) and 1 flake. About 80 percent of the burned rocks were fist-sized, blocky, angular pieces. The remaining larger burned rocks were either subrounded or tabular, measuring from 15x12x3 cm to 20x15x5 cm. These larger burned rocks tended to be located along the northern edge of the test unit and increased in number with depth. Nonetheless, no indications of a discrete internal feature were apparent. In general, the midden deposit gently sloped northwest to southeast and was visible in all three walls of the test unit. Numerous roots were present throughout the

matrix, with a few up to 5 cm in diameter. The single flake was found at 60–70 cm, and one processed flotation sample (collected at 40–50 cm) contained low frequencies of microdebitage and charred wood. A second flotation sample collected at 60–70 cm yielded charred macrobotanical remains of indeterminate wood (see Appendix E).

In Test Unit 2, Feature 1 was encountered across the entire unit from 20 to 60 cm. The ca. 0.4 m<sup>3</sup> of midden deposit yielded 295 burned rocks (224.5 kg), with most (67.7 percent) found between 20 and 40 cm. The majority of the burned rocks were fist sized and angular, with a small percentage of larger, tabular pieces. Two flakes were recovered at 50–60 cm, and a charcoal sample from the same depth yielded a radiocarbon age of 3920 ± 50 B.P. (Beta-102110, see Appendix A). Three processed flotation

samples contained sparse amounts of charred wood and microdebitage. No evidence of disturbance was apparent, and the feature was visible in all four walls of the test unit.

Based on the test unit results and exposures afforded by the excavations and road cut, Feature 1 is estimated to measure 15 m east-west by 13 m north-south. Based on its natural slope, the midden is present from the surface to 70 cm; however, it has a maximum thickness of 50 cm. The overwhelming majority of the feature is located west of, and in, a tank trail. Very little, if any, of the midden deposit occurs east of the exposure. No evidence of vandalism was observed across the terrace surface or in the test excavations.

### **Discussion**

The primary cultural deposit of concern in Subarea C of 41CV1048 is Feature 1, a large burned rock midden. Its condition was reported as pristine at the time of its original recording in 1985. By the time it was formally tested in 1996, the only observed impact was that the eastern edge of the feature had been clipped by a tank trail. Although this damage has severely impacted a portion of the feature, an estimated 85–90 percent of the midden remains intact. Although this midden is obvious, it shows no evidence of vandalism.

Test excavations demonstrate that Feature 1 is a spatially discrete burned rock midden that is largely buried within a Holocene-age deposit. A calibrated radiocarbon date of 2470 (2450) 2325 B.C. (see Appendix A) obtained on charcoal from the base of the feature indicates that the midden accumulation began during the end of the Middle Archaic period. Although no internal features were encountered in the test excavations, the potential is considered to be high because of the areal extent and thickness of the midden deposits. Testing results indicate that the site can provide valuable data concerning midden formation and function, particularly for such features situated in a low-order tributary environment. It is recommended that Subarea C of 41CV1048 be considered eligible for listing in the NRHP.

### **41CV1120**

#### **Site Setting**

Site 41CV1120 is situated in a Holocene

terrace on the south side and within a meander of Table Rock Creek. An erosional channel is located just south of the site and traverses the terrace from west to east, and an eroded military trail bisects the central portion of the site. Vegetation consists of a dense hardwood forest paralleling the bank of Table Rock Creek and scattered juniper trees and grasses farther back on the terrace. Site elevation is 230 m above mean sea level.

### **Previous Work**

Turpin (Texas A&M University) first recorded the site on 31 July 1985. Burned rocks, mussel shells, and lithic artifacts were observed within an area of 40 m north-south by 20 m east-west. The depth of alluvial deposits appeared to be greater than 2 m thick, and an estimated 18 percent of the site was disturbed by a road, erosion, and vandalism.

On 15 October 1992, Abbott and Kleinbach (Mariah Associates) revisited and reevaluated the 50-m-diameter site. Situated on a high Holocene terrace ( $T_{1a}$ ), the site was observed to consist of a scatter of burned rocks, flakes, and mussel shells, with cultural materials observed primarily adjacent to old foxholes or potholes. The site was bounded on the north and east by a lower terrace ( $T_0$ ) and on the south by an intermediate terrace ( $T_{1b}$ ). The higher surface, which slopes gently away from the modern channel, was observed to be underlain by a moderately thick soil with an A-Bw-Bk-C profile developed in light brown sandy loam. These terrace sediments were interpreted as being early to middle Holocene in age, probably correlating with the Fort Hood alluvium (Nordt 1992). The upper horizons were dark grayish brown and may have included a thin drape of late Holocene West Range alluvium. The intermediate surface south of the site was composed of dark loams exhibiting moderate to weak soil development, and probably represented the upper and/or lower West Range fill. The site was moderately disturbed by vehicular traffic, earthmoving, and bioturbation. Due to the potential for buried cultural deposits, shovel testing was recommended.

On 3 November 1992, a crew excavated two shovel tests. Both were positive, with cultural materials found to a maximum depth of 40 cm. Since the site had the potential to contain intact

cultural deposits of unknown significance, formal testing was recommended. A testing effort of at least one backhoe trench and 2–4 m<sup>2</sup> of manually excavated test units was recommended to determine NRHP eligibility (Trierweiler, ed. 1994:A1248–A1249).

### Work Performed

Formal testing of 41CV1120 was completed by Prewitt and Associates on 9 May 1996 (Figure 101). Four backhoe trenches (Backhoe Trenches 1–4) and three 1x1-m test units (Test Units 1–3) were excavated. A total of 5 m<sup>3</sup> was

manually dug.

Backhoe Trench 1 (15.0x1.5x3.2 m) was placed at the north-central portion of the site and oriented to 263°. A Castroville point was found at 20 cm in the south wall, and a Pedernales point found in the backdirt came from the upper 50 cm of the deposit. Burned rocks, flakes, and mussel shells were observed in the upper ca. 70 cm of both trench walls. Backhoe Trench 2 (12.0x1.5x2.7 m) was placed 20 m southeast of Backhoe Trench 1, oriented to 298°, and excavated from the interface of the T<sub>1</sub> and T<sub>0</sub> surfaces out onto the floodplain (T<sub>0</sub>). Backhoe Trench 3 (14.0x1.5x3.4 m) was placed

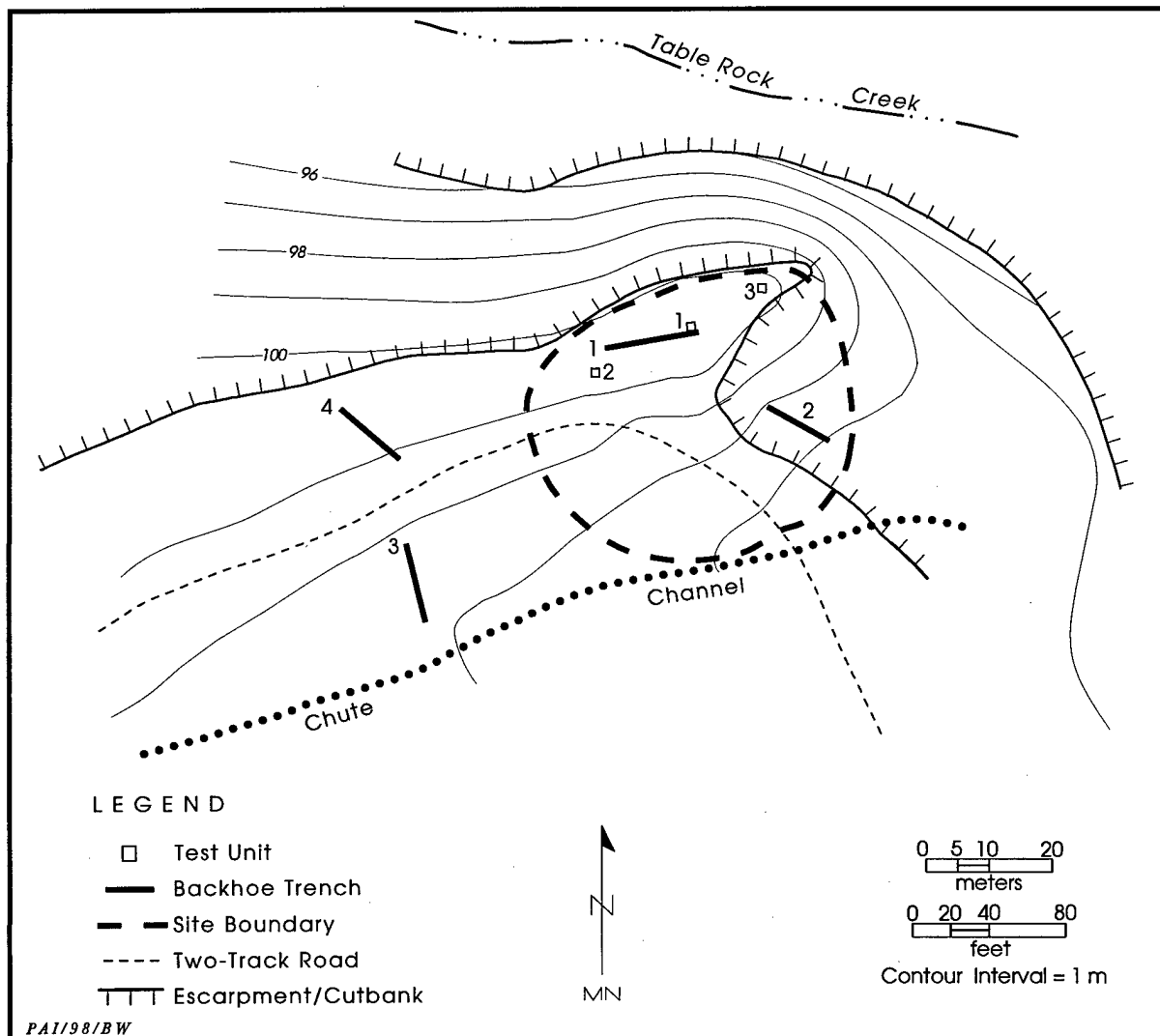


Figure 101. Site map, 41CV1120.

southwest of the site, adjacent to the north side of a chute cutoff, and oriented to 345°. Backhoe Trench 4 (13.0x1.5x3.1 m) was placed west of the site and oriented to 305°. No cultural materials were observed in Backhoe Trenches 2–4. The profiles of Backhoe Trenches 1 and 3 were subsequently described and soil geomorphology was assessed. Bulk sediment samples were collected for radiocarbon dating from a buried soil within Backhoe Trench 1 (see below).

Test Unit 1 was placed along and oriented with the north wall of Backhoe Trench 1; it was excavated to 200 cm. Test Unit 2 was placed 1.5 m south of the west end of Backhoe Trench 1, and Test Unit 3 was placed approximately 12 m north-east of Test Unit 1. Test Units 2 and 3 were oriented to magnetic north and excavated to 150 cm.

### Site Extent and Depth

Testing results indicate that the site covers an area of 50 m east-west by 45 m north-south (see Figure 101). Cultural materials were recovered at 0–130 and 160–170 cm in Test Unit 1, 0–60 cm in Test Unit 2, and 10–110 cm in Test Unit 3. A single mussel shell, which may represent a culturally introduced item, was found at 170–180 cm in Test Unit 1.

### Sediments and Stratigraphy

The examination of backhoe trench profiles at 41CV1120 (Figure 102; see Appendix B) reveals that the previously defined  $T_{1b}$  surface is actually an erosional feature (i.e., a gully) on the  $T_{1a}$  surface rather than a constructional surface, as preliminarily interpreted by Abbott. Backhoe Trench 1 was placed on the eastern margin of the  $T_{1a}$ . The 327-cm-thick profile of Backhoe Trench 1 consisted of a drape of West Range alluvium (0–192 cm) overlying (probably inset to) fine-grained Fort Hood alluvium (192–327+ cm). Soils are imprinted on each fill. The modern soil (A-Bwk-Bwk2-C profile) formed on dark grayish brown, brown to yellowish brown clay loam to sandy clay loam West Range sediments. The buried soil, at 192–327+ cm, consists of a 2ABb-2Bwb profile formed on a brown firm clay loam. A soil humate sample collected from the trench wall at 197–207 cm yielded a conventional radiocarbon age of  $4790 \pm 80$  B.P. (Beta-102112; see Appendix A). The radiocarbon age suggests that the soil developed on a stable

terrace surface that formed near the end of the period of Fort Hood alluvial deposition.

Backhoe Trench 3 crosscut the  $T_{1a}$  surface and the erosional channel or gully. Examination of the trench profile focused on the erosional feature. The 312-cm-thick profile consisted of a B/A-Bwk soil imprinted on fine-grained brown, dark brown, and yellowish brown Fort Hood alluvium. Overlying West Range deposits were not observed, having been stripped away by erosion.

### Cultural Materials

Artifacts were recovered from Backhoe Trench 1 and all three test units. Cultural materials recovered include 241 flakes, 356 (62 kg) burned rocks, and 11 chipped lithic tools (Table 44). The only temporally diagnostic specimens are a Castroville and 2 Pedernales dart points. Recovered faunal remains consist of 29 unmodified mussel shells.

### Cultural Features

Feature 1, a burned rock concentration encountered from 57–68 cm in Test Unit 1, was contained primarily in the eastern half of the unit. It consisted of a single layer of 36 horizontally laid, angular burned rocks (8 kg). Maximum dimensions of the excavated portion of Feature 1 are 69 cm east-west by 59 cm north-south. However, burned rocks visible in the north and east walls indicate that the feature continues for an unknown distance in these directions. Ten flakes and 2 mussel valves were recovered from the feature fill. A flotation sample was collected and processed, but no carbonized macrobotanical remains were present.

Feature 2, another burned rock concentration, was encountered from 80–91 cm in Test Unit 3. Although burned rocks extended across the entire unit, the most concentrated area measured 100 cm east-west by 45 cm north-south along the north wall. The overall dimensions of Feature 2 are unknown, as it extends into all of the test unit walls. Within the test unit, the feature was comprised of a single layer of 60 small to medium-sized angular burned rocks (12 kg) lying horizontally. In addition to charcoal and flotation samples, 8 flakes and 3 mussel valves were recovered from the feature matrix. *Quercus* wood was identified in the flotation samples (see Appendix E). Charcoal from the

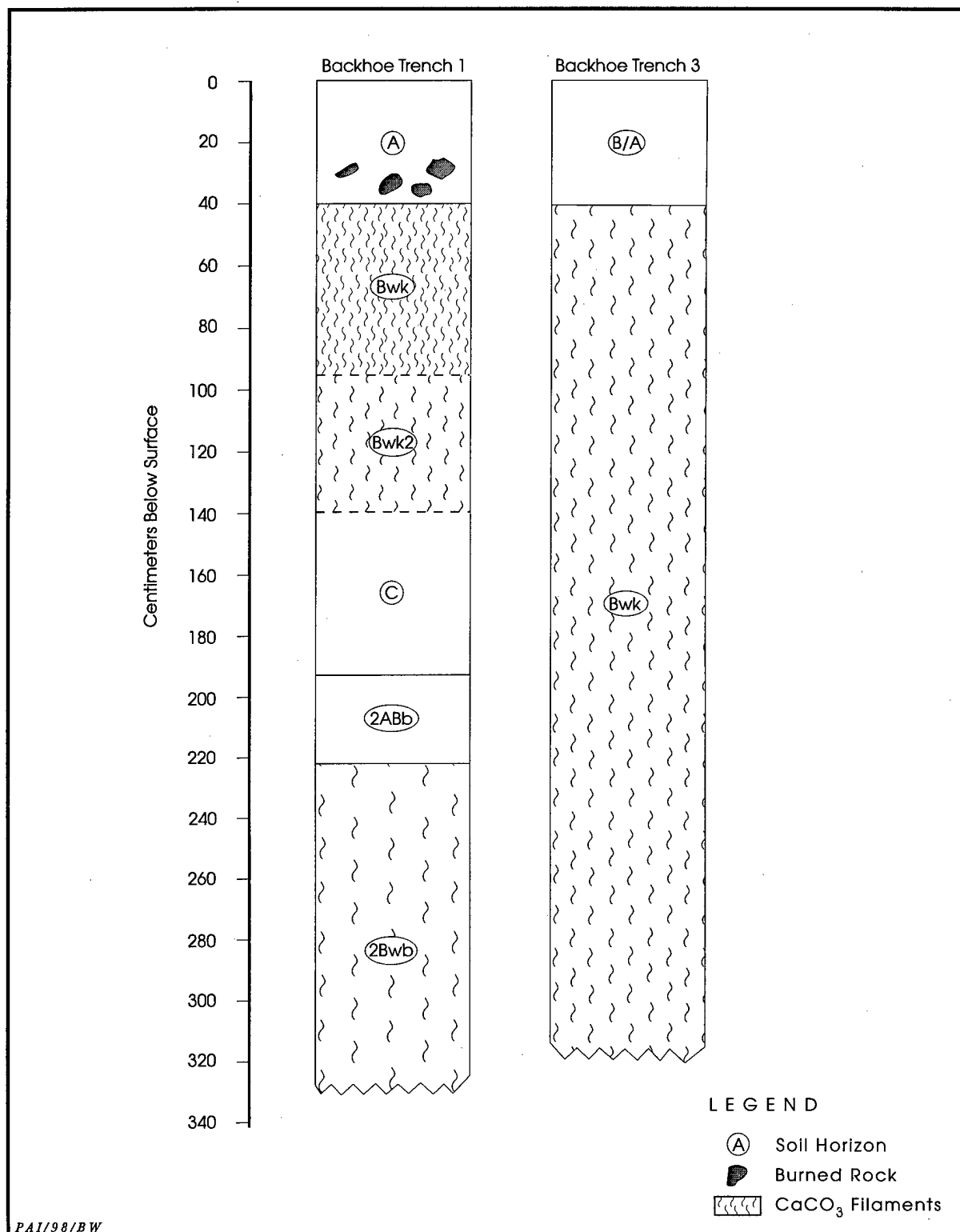


Figure 102. Profiles of Backhoe Trenches 1 and 3, 41CV1120.

Table 44. Summary of cultural materials from 41CV1120

Provenience	Dart Points	Early/Middle-stage Biface	Miscellaneous Bifaces	Miscellaneous Uniface	Spokeshave	Edge-modified Flakes	Unmodified Debitage	Unmodified Shells	Totals
<b>TEST UNIT 1</b>									
Level 1 (0-10 cm)	-	-	-	-	-	-	12	-	12
Level 2 (10-20 cm)	-	-	-	-	-	-	8	-	8
Level 3 (20-30 cm)	-	-	-	-	-	1	2	-	3
Level 4 (30-40 cm)	-	-	1	-	-	-	22	-	23
Level 5 (40-50 cm)	-	-	-	-	-	-	34	-	34
Level 6 (50-60 cm)	-	1	-	-	-	-	24	8	33
Level 7 (60-70 cm)	-	-	-	-	-	-	9	5	14
Level 8 (70-80 cm)	-	-	-	-	-	-	3	-	3
Level 9 (80-90 cm)	-	-	-	-	-	-	-	-	0
Level 10 (90-100 cm)	-	-	1	-	-	-	3	-	4
Level 11 (100-110 cm)	-	-	-	-	-	-	1	3	4
Level 18 (170-180 cm)	-	-	-	-	-	-	-	1	1
Feature 1 (57-68 cm)	-	-	-	-	-	-	10	2	12
Subtotals	0	1	2	0	0	1	128	19	151
<b>TEST UNIT 2</b>									
Level 1 (0-10 cm)	-	-	-	-	-	-	-	-	0
Level 2 (10-20 cm)	-	-	-	-	-	-	15	2	17
Level 3 (20-30 cm)	-	-	-	1	1	-	25	-	27
Level 4 (30-40 cm)	-	-	-	-	-	-	2	-	2
Level 5 (40-50 cm)	-	-	-	-	-	-	-	1	1
Level 6 (50-60 cm)	-	-	-	-	-	-	1	-	1
Subtotals	0	0	0	1	1	0	43	3	48
<b>TEST UNIT 3</b>									
Level 1 (0-10 cm)	-	-	-	-	-	-	-	-	0
Level 2 (10-20 cm)	-	-	-	-	-	1	9	-	10
Level 3 (20-30 cm)	-	-	-	-	-	-	6	-	6
Level 4 (30-40 cm)	-	-	-	-	-	-	8	-	8
Level 5 (40-50 cm)	-	-	-	-	-	-	6	-	6
Level 6 (50-60 cm)	-	-	-	-	-	-	4	-	4
Level 7 (60-70 cm)	-	-	-	-	-	-	5	-	5
Level 8 (70-80 cm)	-	-	-	-	-	1	8	-	9
Feature 2 (80-91 cm)	-	-	-	-	-	-	8	3	11
Level 10 (90-100 cm)	-	-	-	-	-	-	12	4	16
Level 11 (100-110 cm)	1	-	-	-	-	-	3	-	4
Level 14 (130-140 cm)	-	-	-	-	-	-	1	-	1
Subtotals	1	0	0	0	0	2	70	7	80
<b>BACKHOE TRENCH 1</b>									
20 cm	1	-	-	-	-	-	-	-	1
0-50 cm	1	-	-	-	-	-	-	-	1
Subtotals	2	0	0	0	0	0	0	0	2
<b>Totals</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>241</b>	<b>29</b>	<b>281</b>

feature matrix yielded a conventional radiocarbon age of  $3070 \pm 50$  B.P. (Beta-102111; see Appendix A).

### **Discussion**

Although a calibrated radiocarbon date of 3655–3395 B.C. was obtained on charcoal from ca. 200 cm deep in the buried soil in Backhoe Trench 1, no cultural materials were discovered at this depth. A calibrated radiocarbon date of 1400 (1315) 1265 B.C. (see Appendix A), obtained from charcoal 80–82 cm below the surface in Test Unit 3, is associated with a burned rock concentration (Feature 2). When considering these dates, approximately 120 cm of deposits were laid down in a span of 2,390 and 1,995 years. Assuming 2,150 years as the approximate time span, the rate of deposition of this deposit was roughly 10 cm every 179 years. The radiocarbon date on the feature, along with the Castroville dart point found at 20 cm below surface in Backhoe Trench 1 and the Pedernales point recovered from the upper 50 cm of sediment in Backhoe Trench 1, indicate that the site contains a series of Late Archaic cultural occupations. Stratigraphic evidence indicates that isolable occupation zones with associated faunal (i.e., shell) and macrobotanical remains are present. It is recommended that 41CV1120 be considered eligible for listing in the NRHP.

### **41CV1122**

#### **Site Setting**

Site 41CV1122 is situated on the south side of Table Rock Creek. The site extends south from the edge of the creek (north site boundary), across a narrow terrace, up onto a colluvial toeslope. A deeply incised tributary of Table Rock creek flows southwest-northeast along the western margin of the site and joins Table Rock Creek north of the site. Disturbances include a frequently traveled military trail from east to west across the site, a bulldozer cut along the base of the colluvial slope, cutbank erosion, and a few vandal holes along the edge of Table Rock Creek. With the exception of a fairly dense strip of cedar and hardwood trees along the edge of the tributary and Table Rock Creek, the site is open and covered with grasses. Site elevation is 230 m above mean sea level.

### **Previous Work**

The site was initially recorded by Bradle and Turpin (Texas A&M University) on 1 August 1985 as containing a burned rock concentration and a low-density scatter of debitage and mussel shells. Cultural materials were observed just below the surface in potholes near the cutbank of Table Rock Creek. Site dimensions were defined as 85x60 m, with a northeast-southwest long axis. Overall, the site was noted as being 53 percent disturbed by roads, vehicles, and vandalism.

On 15 October 1992, Abbott and Kleinbach (Mariah Associates) reassessed the site based on geomorphic observations and the potential for intact cultural deposits. Site dimensions were altered to 60 m east-west by 40 m north-south. The site was divided into Subarea A, the alluvial terrace, and Subarea B, the colluvial toeslope. The terrace comprising Subarea A consisted of ca. 4 m of weakly stratified loamy to clayey alluvium resting on bedrock, representing a moderately well developed soil with an early to middle Holocene unit (Fort Hood Alluvium) overlain by a welded drape of the late Holocene unit (West Range). This fill exhibited a weak A-Bt-Bk-C profile, and several lenses of cultural materials were noted in the upper meter. An occupation zone (15–20 m long), consisting of dense burned rocks and a few flakes and mussel shells, was located at 40–70 cm within the cutbank of Table Rock Creek.

Subarea B was identified as an erosional slope of weathered limestone regolith mantled with limestone cobbles and large carbonate nodules derived from erosion of Pleistocene alluvium upslope. A burned rock midden (20 m long by 5 m wide) in a questionable state of preservation provided the only opportunity for stratigraphic integrity in this subarea.

Three shovel tests were excavated to 40 cm; two were in Subarea A and one was in the burned rock midden in Subarea B. One shovel test in Subarea A, placed in a probable midden, yielded several burned rocks and flakes and a tin at 0–40 cm. The other test in Subarea A produced a few artifacts in each 10-cm level, but no modern items. The test in the midden in Subarea B yielded numerous burned rocks and mussel shell fragments and several flakes. Recent items (i.e., metal and rubber) were found in the upper 10 cm. Based on these results, the investigators

concluded that both subareas of 41CV1122 had the potential to contain intact cultural deposits of unknown significance. A minimum testing effort of two backhoe trenches and 4–6 m<sup>2</sup> of manually excavated test units was recommended to determine NRHP eligibility (Trierweiler, ed. 1994:A1251–A1253).

### **Work Performed**

Formal testing of 41CV1122 was completed by Prewitt and Associates in May 1996 (Figure 103). Three backhoe trenches (Backhoe Trenches 1–3) and two 1x1-m test units (Test Units 1–2) were excavated in Subarea A, and one 1x1-m test unit (Test Unit 3) was excavated in the midden (Feature 1) in Subarea B. A total volume of 4.1 m<sup>3</sup> was manually dug.

Backhoe Trench 1 (11.0x0.8x1.6 m) was placed near the eastern margin of the site and excavated from the edge of the Table Rock Creek cutbank upslope toward Feature 1 in Subarea B. This trench was oriented to 216° and excavated to bedrock. Backhoe Trench 2 (13.0x1.5x3.3 m, oriented to 338°) was placed at the central portion of Subarea A, above the confluence of the unnamed tributary and Table Rock Creek. Backhoe Trench 3 (14.0x0.8x2.1 m, oriented to 340°) was placed along the western margin of the site above the unnamed tributary.

A burned rock midden (Feature 2) was encountered in the upper fill of Backhoe Trench 1. Several lenses of burned rocks, mussel shells, and debitage were observed in the walls of Backhoe Trench 2 to a depth of ca. 2 m. Two Pedernales dart points were collected: one from each of the backdirt piles of Backhoe Trenches 1 and 2. Only a few burned rocks were observed within the walls of Backhoe Trench 3, thus defining the probable western edge of the site. All three trench profiles were subsequently described and soil geomorphology was assessed.

Test Unit 1, excavated to 210 cm, was oriented with and placed along the east wall of Backhoe Trench 2. Test Unit 2, excavated to bedrock at 150 cm, was placed adjacent to the north end of Backhoe Trench 1, ca. 1 m from the cutbank edge. Test Unit 3, excavated to bedrock at 50 cm, was placed near the apparent central portion of Feature 1 in Subarea B. Test Units 2 and 3 were oriented to magnetic north.

### **Site Extent and Depth**

Based on the horizontal extent of subsurface materials, site 41CV1122 covers an area of 75 m northeast-southwest by 45 m northwest-southeast. Cultural artifacts were found from 0–190 cm in Test Unit 1 and from 0–140 cm in Test Unit 2 in Subarea A. Cultural materials recovered from 0–40 cm in Test Unit 3 are associated with the midden in Subarea B.

### **Sediments and Stratigraphy**

The trench profiles of 41CV1122 (see Appendix B) reveal a drape of fine-grained West Range alluvium overlying Fort Hood alluvium and colluvium (Figure 104). Most of the cultural materials and features are encapsulated in the West Range alluvium. Some features yielded radiocarbon ages that indicate they are contained in the lower West Range alluvium (ca. 4300 to 2800–2400 B.P.). Previous geomorphological investigations have noted that lower West Range deposits are typically coarse grained due to the greater preservation of gravelly channel fill facies of bedload-dominated braided stream systems (Nordt 1992), rather than the fine-grained deposits observed and dated at 41CV1122. The sediments at 41CV1122 indicate that lower West Range deposits are preserved along Table Rock Creek, which confirms Nordt's (1992:66) previous geomorphic observation that this alluvial unit is rare or absent in the Table Rock Creek valley.

The profile of Backhoe Trench 1 consists of West Range alluvium (0–60 cm) overlying Fort Hood alluvium (60–92 cm). The Fort Hood alluvium rests directly on weathered Glen Rose limestone. The profile exhibits an A-Bk-Ck-R soil. Backhoe Trench 2 revealed a thick drape of West Range alluvium (0–122 cm) overlying loamy Fort Hood alluvium and colluvium (122–308+ cm). The West Range drape consists of dark loamy sediments, while the Fort Hood unit consists of brown and light yellowish brown loamy sediments and matrix-supported gravels, believed to represent a mix of alluvial and colluvial deposits. The profile exhibits an A-B-Bwk-2Bwkb-2C soil, blurring the boundary between the two fills. Backhoe Trench 3 consists of a drape of West Range alluvium (0–58 cm) welded to the underlying Fort Hood alluvium (58–196+ cm). As in Backhoe Trench 2, the boundary between the two is masked by the development of an A-2Abk-2BCK soil.



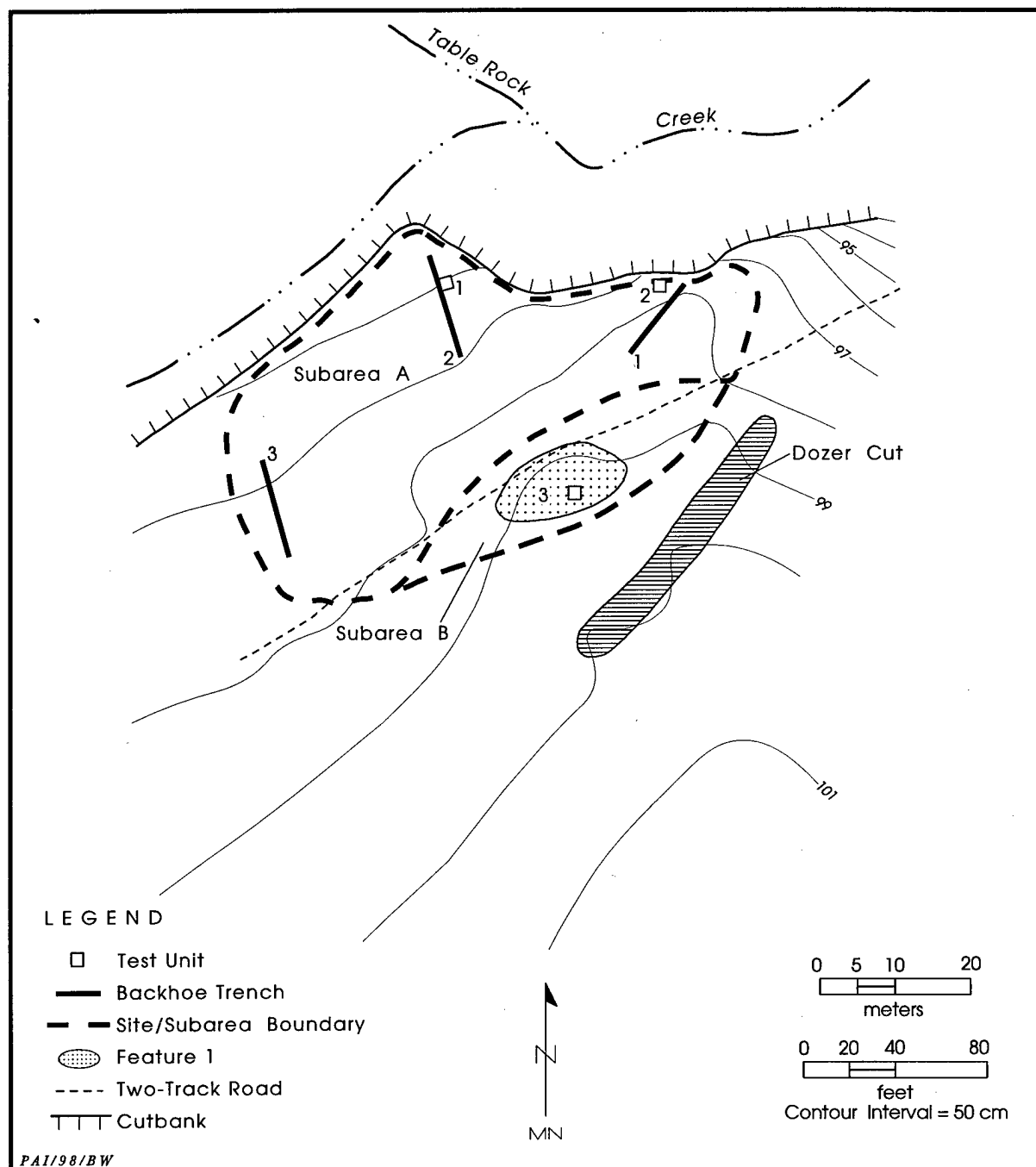


Figure 103. Site map, 41CV1122.

### Definition and Interpretation of Analysis Units

Two analysis units are defined for the site. Analysis Unit 1 includes the cultural deposits from 0–80 cm in Test Unit 1, 0–90 cm in Test

Unit 2, and 0–50 cm in Test Unit 3. This analysis unit is assigned to the Late Archaic on the basis of three conventional radiocarbon ages discussed below. Analysis Unit 2 consists of the deposits from 80–210 cm in Test Unit 1 and from 90–150 cm in Test Unit 2. This analysis unit is

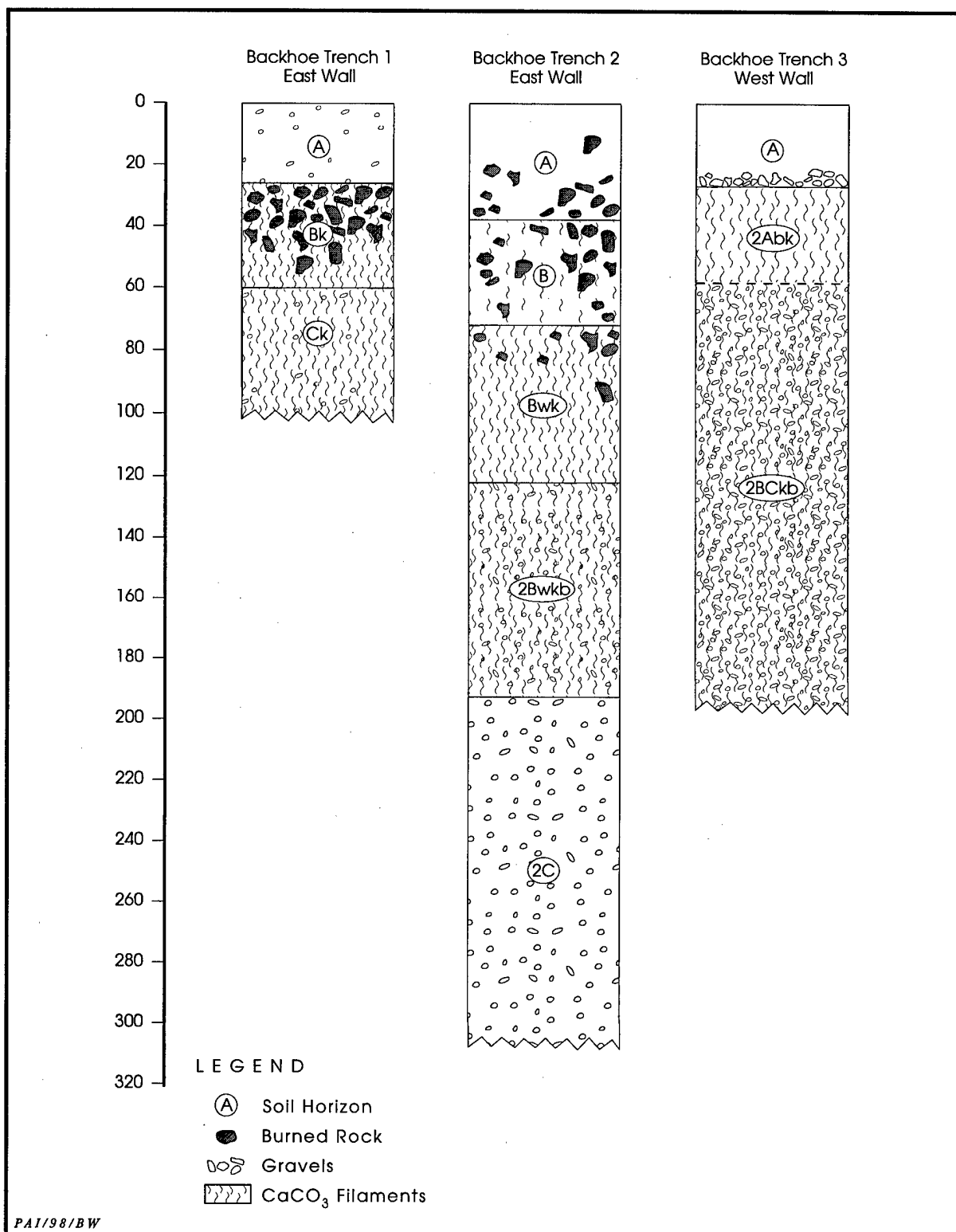


Figure 104. Profiles of Backhoe Trenches 1-3, 41CV1122.

assigned to the Middle Archaic on the basis of three conventional radiocarbon ages discussed below.

### Analysis Unit 1

#### *Cultural Materials*

A fairly large assemblage of artifacts is attributed to Analysis Unit 1, including 692 flakes, 2,112 burned rocks (258 kg), 20 chipped lithic tools, a ground piece of hematite, 3 Pedernales points, and 1 Castroville point (Table 45). Faunal remains include 41 unmodified mussel shells and 15 bones (see Appendix D).

#### *Cultural Features*

Based on surface exposure, Feature 1, a burned rock midden, was observed over a 17x9-m area along the south edge of a trail that transects the site. The northern edge of this midden has been disturbed, and cultural debris is scattered along the trail. Within Test Unit 3, a relatively consistent amount of cultural materials was found in each 10-cm-level from 0–40 cm. Recovery consists of 10 flakes, 230 burned rocks (52.5 kg), and 2 bones. No patterning to the burned rocks was discerned. Evidence of disturbance (i.e., glass fragments and military debris) was found at 0–20 cm. Flotation samples of matrix from 20–40 cm were collected and processed but not sent for macrobotanical analysis. However, a small amount of charcoal from a sample at 20–30 cm yielded a conventional radiocarbon age of  $3000 \pm 40$  B.P. (Beta-102115; see Appendix A).

Feature 2, another burned rock midden, is thickest at the north end of Backhoe Trench 1 adjacent to the cutbank edge. The midden is 44 cm thick (40–84 cm below surface) at this point but becomes increasingly thinner and less dense upslope. Based on its morphology in the trench profiles and cultural materials exposed in potholes, the dimensions of the midden are estimated to be 25 m east-west by 15 m north-south. Although many burned rocks ( $n = 19$  to 100, 0.5 to 2.5 kg) were found in each 10-cm level from 0–40 cm in Test Unit 2, all were small scattered fragments not considered to be part of the underlying midden. Within the test unit, Feature 2 was encountered from 40–80 cm but generally sloped from south to north (probably following the

natural slope) and was approximately 30 cm thick. It consisted of a dense zone of fractured angular and blocky pieces of limestone in which no internal patterning was recognized. The rocks were generally less than 10 cm in maximum length. A total of 1,312 burned rocks (152 kg), 166 pieces of debitage, 3 bifaces, 2 unifaces, 1 core tool, 1 Pedernales point base, and 19 mussel shells were recovered from the feature. A flotation sample only yielded a few indeterminable wood fragments (see Appendix E). A conventional radiocarbon age of  $3060 \pm 40$  B.P. (Beta-102116; see Appendix A) was obtained on charcoal recovered from 70–80 cm in Test Unit 2.

Feature 3 was encountered in Test Unit 1 from 70–80 cm. The feature consisted of a single discrete layer of fractured (blocky) burned rocks that covered the entire unit at that level. Recovery from the feature matrix includes 75 (18 kg) burned rocks, 39 flakes, 1 uniface, 1 multifunctional tool consisting of a graver and side scraper, 2 edge-modified flakes, and 1 indeterminate bone fragment. A conventional radiocarbon age of  $3520 \pm 40$  B.P. was obtained on charcoal (Beta-102117; see Appendix A). The function of this burned rock concentration is not known.

### *Discussion*

The most substantive cultural deposits attributed to Analysis Unit 1 are in Subarea A and are buried within the upper 80–90 cm of alluvium. These include a burned rock midden (Feature 2) and a burned rock concentration (Feature 3). The burned rock midden (Feature 1) in Subarea B also is attributed to Analysis Unit 1. Calibrated radiocarbon dates of 1285–1145 B.C., 1390–1265 B.C., and 1895–1760 B.C. on charcoal from these three features (Features 1–3, respectively) denote intensive occupations at 41CV1122 during the Late Archaic period. The only diagnostic artifacts recovered, a Castroville and three Pedernales points, support this assessment. It is particularly notable that both of the burned rock middens are virtually contemporaneous. Although the surficial midden (Feature 1) has been severely disturbed and contains mixed deposits, the buried midden (Feature 2) is largely intact and appears to have been only minimally disturbed by vandalism. In contrast to these thick midden accumulations, Feature 3 appears to represent a thin occupational layer or isolable Late Archaic component.

Table 45. Summary of cultural materials from 41CV1122, Analysis Unit 1

Provenience	Dart Points	Late-stage/ Finished Bifaces	Miscellaneous Bifaces	Miscellaneous Unifaces	Core Tools	Multifunctional Tools	Edge-modified Flakes	Core	Unmodified Debitage	Modified Hematite	Unmodified Bones	Unmodified Shells	Totals
<b>TEST UNIT 1</b>													
Level 1 (0-10 cm)	-	-	-	-	-	-	-	-	2	-	-	1	3
Level 2 (10-20 cm)	-	-	-	-	-	-	-	-	3	-	-	-	3
Level 3 (20-30 cm)	-	-	-	-	-	-	-	-	29	-	-	-	29
Level 4 (30-40 cm)	-	-	-	-	-	-	3	-	50	1	1	-	55
Level 5 (40-50 cm)	2	-	-	-	-	-	-	1	89	-	6	-	93
Level 6 (50-60 cm)	1	1	-	1	-	-	-	-	79	-	2	2	90
Level 7 (60-70 cm)	-	-	-	-	-	-	-	-	49	-	1	3	54
Feature 3 (70-80 cm)	-	-	-	1	-	1	2	-	39	-	-	-	44
Subtotals	3	1	0	2	0	1	5	1	340	1	11	6	371
<b>TEST UNIT 2</b>													
Level 1 (0-10 cm)	-	-	-	-	-	-	1	-	24	-	-	1	26
Level 2 (10-20 cm)	-	-	1	-	-	1	-	-	38	-	2	-	42
Level 3 (20-30 cm)	-	-	-	-	-	-	-	-	65	-	-	3	68
Level 4 (30-40 cm)	-	-	-	-	-	-	-	-	27	-	-	-	27
Feature 2 (40-50 cm)	-	1	1	1	-	-	-	-	46	-	-	1	50
Feature 2 (50-60 cm)	1	-	1	-	-	-	-	-	62	-	-	5	69
Feature 2 (60-70 cm)	-	-	-	1	-	-	-	-	31	-	-	9	41
Feature 2 (70-80 cm)	-	-	-	-	1	-	-	-	27	-	-	4	32
Level 8 (70-80 cm)	-	-	-	-	1	-	-	-	4	-	-	3	8
Level 9 (80-90 cm)	-	-	-	-	-	-	-	-	18	-	-	9	27
Subtotals	1	1	3	2	2	1	1	0	342	0	2	35	390
<b>TEST UNIT 3</b>													
Feature 1 (0-10 cm)	-	-	-	-	-	-	-	-	2	-	1	-	3
Feature 1 (10-20 cm)	-	-	-	-	-	-	-	-	3	-	-	-	3
Feature 1 (20-30 cm)	-	-	-	-	-	-	-	-	3	-	1	-	4
Feature 1 (30-40 cm)	-	-	-	-	-	-	-	-	2	-	-	-	2
Level 5 (40-50 cm)	-	-	-	-	-	-	-	-	-	-	-	-	0
Subtotals	0	0	0	0	0	0	0	0	10	0	2	0	12
Totals	4	2	3	4	2	2	6	1	692	1	15	41	773

**Analysis Unit 2****Cultural Materials**

Cultural artifacts associated with Analysis Unit 2 include 166 flakes, 497 burned rocks (160 kg), 7 chipped lithic tools, and 2 untypeable dart points (Table 46). Faunal remains include 100 bones and 28 mussel shells (see Appendix D).

**Cultural Features**

Feature 4, a large baking pit feature, was encountered from 100–129 cm in Test Unit 2. It went along, but did not extend into, the south wall of the unit. Since no burned rocks were observed at this depth within the walls of Backhoe Trench 1, it was assumed that this was the southern edge of the feature. As was the case

for Feature 2, the burned rocks within this feature sloped to the north. While the slope of Feature 2 is thought to follow the former ground surface, the slope of the rocks in Feature 4 appeared to reflect, at least in part, the preparation of a pit. The outer (southern) edge of the feature was composed of one to two layers of mainly blocky fractured pieces of limestone, while the lower central area contained up to four layers of larger blocky and tabular pieces, some unfractured and some fractured in place. The largest rock (60x25x10 cm, 21 kg) was located at the base of the feature along the north wall of the unit at 129 cm. It was thermally fractured into 10 pieces but was in place. Overall recovery from the feature includes 136 burned pieces of limestone (102 kg), 12 flakes, 1 edge-modified flake, 2 mussel shells, 3 bones, the distal end of a dart point, and charcoal chunks. With the

**Table 46. Summary of cultural materials from 41CV1122, Analysis Unit 2**

Provenience	Dart Points	Miscellaneous Unifaces	Spokeshave	Edge-modified Flakes	Core	Unmodified Debitage	Unmodified Bones	Unmodified Shells	Totals
<b>TEST UNIT 1</b>									
Feature 5 (80–96 cm)	–	–	–	1	1	3	–	1	6
Level 9 (80–90 cm)	1	–	–	–	–	26	1	1	29
Level 10 (90–100 cm)	–	–	–	–	–	1	–	–	1
Level 11 (100–110 cm)	–	–	–	–	–	2	–	2	4
Level 12 (110–120 cm)	–	–	–	–	–	6	2	2	10
Level 13 (120–130 cm)	–	–	–	–	–	9	1	3	13
Level 14 (130–140 cm)	–	1	–	1	–	7	–	3	12
Level 15 (140–150 cm)	–	–	–	–	–	7	2	4	13
Level 16 (150–160 cm)	–	1	–	–	–	29	45	3	78
Level 17 (160–170 cm)	–	–	1	–	–	41	43	–	85
Level 18 (170–180 cm)	–	–	–	–	–	2	3	–	5
Level 19 (180–190 cm)	–	–	–	–	–	1	–	–	1
Subtotals	1	2	1	2	1	134	97	19	257
<b>TEST UNIT 2</b>									
Level 10 (90–100 cm)	–	–	–	–	–	19	–	7	26
Level 11 (100–110 cm)	–	–	–	–	–	–	–	–	0
Level 12 (110–120 cm)	–	–	–	–	–	–	–	–	0
Level 13 (120–130 cm)	–	–	–	–	–	–	–	–	0
Level 14 (130–140 cm)	–	–	–	–	–	1	–	–	1
Level 15 (140–150 cm)	–	–	–	–	–	–	–	–	0
Feature 4 (100–129 cm)	1	–	–	1	–	12	3	2	19
Subtotals	1	0	0	1	0	32	3	9	46
<b>Totals</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>166</b>	<b>100</b>	<b>28</b>	<b>303</b>

exception of charcoal and mussel shell fragments, no cultural materials were found in the matrix surrounding the feature at 110–130 cm. Burned rocks extended into the north, east, and west walls of the unit, and the feature exhibited a distinctive basin-shaped morphology. It appeared that the unit had been excavated through the southern one-half to one-third of a large rock-filled pit. Macrobotanical remains identified in a flotation sample included *Quercus* and *Salicaceae* wood. A conventional radiocarbon age of  $5090 \pm 50$  B.P. was obtained on charcoal from the feature (Beta-102113; see Appendix A).

Feature 5, a discrete layer of fractured burned rocks, was encountered directly below Feature 3 in Test Unit 1 from 80–96 cm. The majority of the rocks were concentrated in the southwestern half of the unit. Recovery from the feature includes 190 (33.5 kg) burned rocks, 3 flakes, 1 edge-modified flake, 1 core, and 1 mussel shell. A conventional radiocarbon age of  $4140 \pm 50$  B.P. was obtained on charcoal from this feature (Beta-102118; see Appendix A).

Although it was not recorded as a feature in the field, a relatively high concentration of lithic artifacts and unmodified bones was present from 150–170 cm in Test Unit 1. Recovered from this 20-cm-thick zone were 70 flakes, 2 stone tools, 88 unmodified bones, and 3 unmodified shells (see Table 46). Of the identifiable bones, 38 are from medium-large mammals, 4 are from large mammals, and 1 is a canine tooth (see Appendix D). This layer of concentrated lithics and bones is interpreted as an occupation zone representing intensive activities/use (as compared with the much lower densities of cultural materials in the excavation levels above and below). A charcoal sample from within this occupation zone, at 151 cm below surface, yielded a conventional radiocarbon age of  $5090 \pm 70$  B.P. (Beta-102114; see Appendix A).

### Discussion

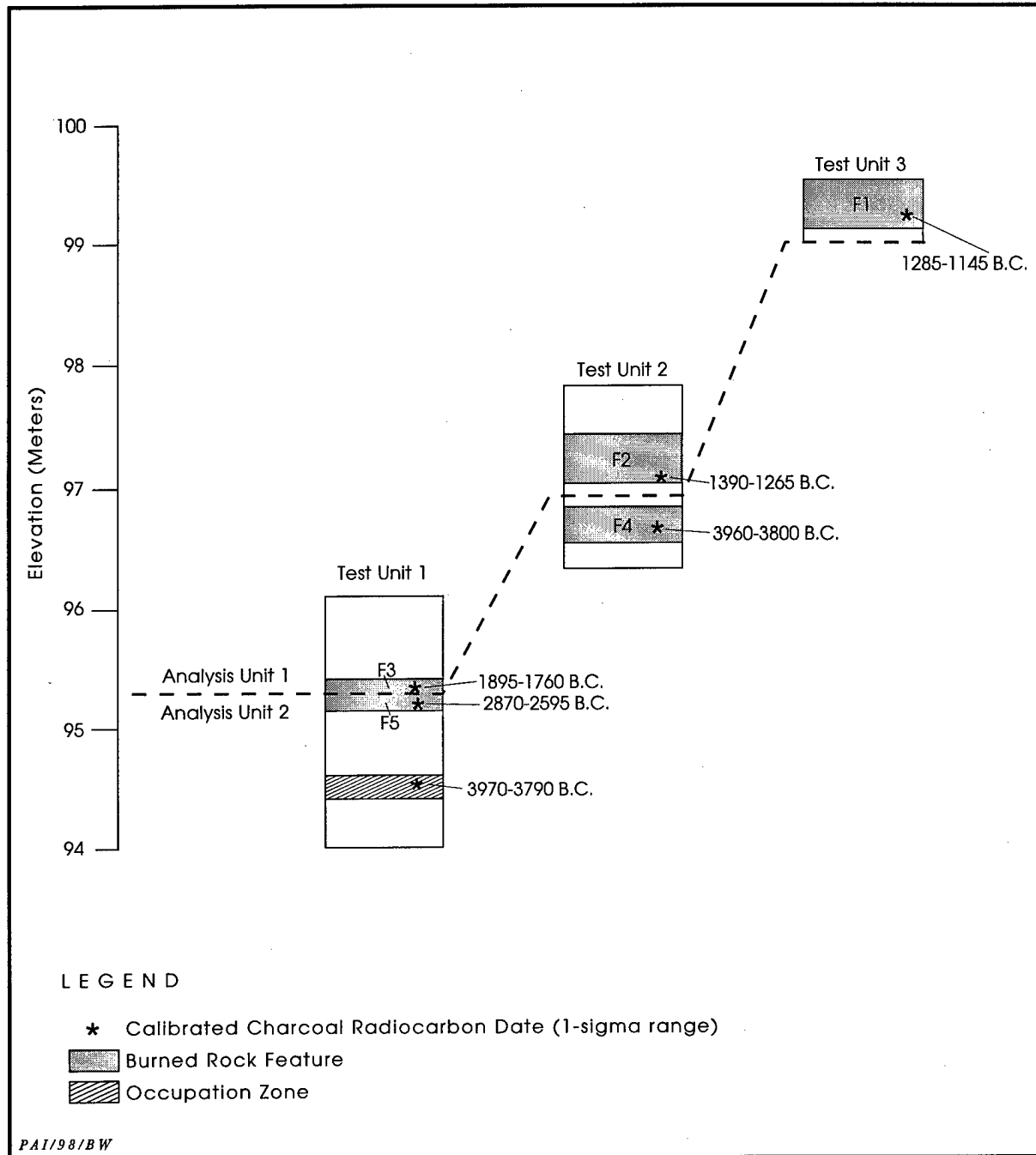
Three radiocarbon ages from the lower alluvial deposits in Subarea A of 41CV1122 define Analysis Unit 2 as a series of Middle Archaic occupations, but no diagnostic artifacts were found. Calibrated radiocarbon dates of 3960–3800 B.C. and 2870–2595 B.C. were obtained on charcoal from Features 4 and 5, respectively, and a calibrated date of 3970–3790 B.C. was obtained on charcoal from nonfeature sediment

at 151 cm in Test Unit 1 (see Appendix A). The latter date is associated with a probable occupation zone 150–170 cm below the surface. It is notable that the age of Feature 4, a baking pit, is virtually identical, indicating that this was the period of most-intensive occupation within the testing area.

### Summary and Conclusions

41CV1122 is a relatively small site (only ca. 45x75 m), but archeological testing revealed the presence of a Late Archaic burned rock midden (Feature 1) in a stable upland setting and stratified Middle to Late Archaic period cultural features and occupational debris in the alluvial deposits of Table Rock Creek. Stratigraphic correlation of five burned rock features, an occupational zone, and six calibrated radiocarbon dates in Figure 105 show how Analysis Units 1 and 2 are defined. Analysis Unit 1 is a series of Late Archaic occupations/activities and includes the upslope burned rock midden and the upper alluvial deposits (West Range), while Analysis Unit 2 is a series of Middle Archaic occupations/activities within the lower alluvial deposits (Fort Hood).

For Analysis Unit 2, the two radiocarbon dates from Test Unit 1 provide a crude measure of the rate of alluvial deposition. The two dated samples in this unit were vertically separated by 60–70 cm of fine-grained alluvium, and the calibrated dates show that this deposition occurred over a period of ca. 920 to 1,375 years. Based on these figures, the rate of deposition may be calculated as somewhere between 4.4 cm per century (i.e., 60 cm over 1,375 years) and 7.6 cm per century (i.e., 70 cm over 920 years). The next ca. 15–25 cm of deposits in Test Unit 1 encompasses the time when both burned rock Features 5 and 3 accumulated and represents a time span of 700 to 1,110 years. Thus, the rate of deposition for this zone is between 1.4 cm per century (i.e., 15 cm over 1,100 years) and 3.6 cm per century (i.e., 25 cm over 700 years). The depositional history of these units represents the rapid accumulation of the Fort Hood alluvium (i.e., Analysis Unit 2) prior to and through ca. 3900–3800 B.C. until ca. 2800–2600 B.C., at which time deposition ceased, the alluvial terrace surface stabilized, and Feature 5 was constructed and utilized. A subsequent period of deposition, represented by the West Range alluvium,



**Figure 105.** Stratigraphic correlation of features and calibrated radiocarbon dates associated with Analysis Units 1 and 2, 41CV1122.

indicates a much slower rate (1.4 to 3.6 cm/century) of deposition. The much lower rate of deposition for the later unit may explain the lack or near absence of early West Range sediments (i.e., the lower West Range member) within the

Table Rock Creek valley. Although no radiocarbon dates were obtained for the upper deposits of Analysis Unit 1, it is probable that they represent the upper West Range member and a higher rate of deposition. Thus, based on the

radiocarbon assays and calculated rates of deposition, the definition of, and break between the two analytical units seems appropriate.

The chronostratigraphic evidence in Test Unit 2 is not as precise but suggests that the stratigraphy in this portion of the site is more compressed, the possible result of a more distal floodplain position (and ensuing lower rates of deposition) at the time of deposition. Between 20 and 59 cm of deposition occurred between the time the baking pit (Feature 4) was used and the time the burned rock midden (Feature 2) started to accumulate. The span of time involved, between ca. 2,410 and 2,695 years, suggests a depositional rate of 0.8 cm per century (i.e., 20 cm over 2,410 years) to 2.2 cm per century (i.e., 59 cm over 2,695 years). Even if the maximum difference of 89 cm from the very top of the midden (when its accumulation ended) to the very bottom of the baking pit is used, the maximum rate of deposition would be 3.3 cm per century (i.e., 89 cm over 2,695 years). Although this estimate is probably not realistic (the dated charcoal sample from the bottom of the midden is not likely to represent the age when midden accumulation ceased), it nonetheless reveals a much lower rate of Fort Hood alluvial deposition than in Test Unit 1. The earlier radiocarbon date in Test Unit 2, which is similar to the earliest radiocarbon date in Test Unit 1 but ca. 175 cm higher in elevation, also reveals the time transgressive nature of the Fort Hood alluvium (see Nordt 1992:66).

Because it contains stratified deposits containing intact features with associated material culture and macrobotanical remains, this site has a high research potential and could contribute important data for the Middle and Late Archaic periods. It is recommended that 41CV1122 be considered eligible for listing in the NRHP.

### **41CV1133**

#### **Site Setting**

Site 41CV1133 is situated on a section of a fairly extensive T<sub>1</sub> terrace on the south side of Table Rock Creek. While the southern half of the site contains a dense forest of juniper trees, the northern half only has scattered juniper and pecan trees. This vegetation difference is the result of many juniper trees having been cleared from the northern site area and pushed to the front edge of the terrace. A slight, but noticeable,

east-west rise transects the terrace and middle portion of the site. At the center of the site, a burned rock midden (Feature 1) rests atop this rise. With the exception of a few small depressions and heavy machine tracks associated with this cedar clearing, the site is relatively undisturbed. Site elevation is 230 m above mean sea level.

#### **Previous Work**

The site was initially recorded by Bradle and Roemer (Texas A&M University) on 13 August 1985 as a burned rock and lithic scatter. Its dimensions were defined as 100 m in diameter. One Marshall and one untyped dart point were collected. Although a dense concentration of burned rocks and debitage was observed, few lithic tools were noted. The site was estimated to be 80 percent disturbed by vandalism, a tank trail, vehicular traffic, and erosion, but was thought to have been minimally vandalized within the last 10–30 years. Observed excavations and spoil piles were flattened by erosion and appeared old.

Abbott and Kleinbach (Mariah Associates) reassessed the site on 15 October 1992 on the basis of geomorphic observations and the potential for intact cultural deposits. Site dimensions were slightly altered to 100 m east-west by 80 m north-south. Because the site was situated near the center of a broad and densely vegetated terrace that afforded no exposures, an evaluation of the stratigraphy was not possible. A 30–35-m-diameter burned rock feature was exposed on the surface as a result of military activity and tree clearing, and possibly by plowing and vandalism. An Andice dart point was collected, and a moderate amount of burned rocks, some flakes, and a few bifaces and mussel shells were observed. Because of the potential for intact cultural deposits, 10 shovel tests were excavated. Six of the 10 tests were positive, with recovery including a total of 20 pieces of debitage, 1,214 burned rocks, and 20 mussel shell fragments. Most of these items was recovered from 0–60 cm in a shovel test placed in the burned rock feature (Feature 1). Based on these results, the investigators concluded that the site had the potential for intact cultural materials of unknown significance in a good depositional context. A minimum testing effort of three backhoe trenches and 2–4 m<sup>2</sup> of manually excavated test pits was recommended to determine the NRHP eligibility of the



site (Trierweiler, ed. 1994:A1266–A1268).

### Work Performed

Formal testing of 41CV1133 was completed by Prewitt and Associates in late May 1996

(Figure 106). Four backhoe trenches (Backhoe Trenches 1–4) and four 1x1-m test units (Test Units 1–4) were excavated. A total of 3.3 m<sup>3</sup> was manually dug.

Backhoe Trench 1 (34.0x0.8x1.5 m, oriented to 229°) was excavated through the burned rock

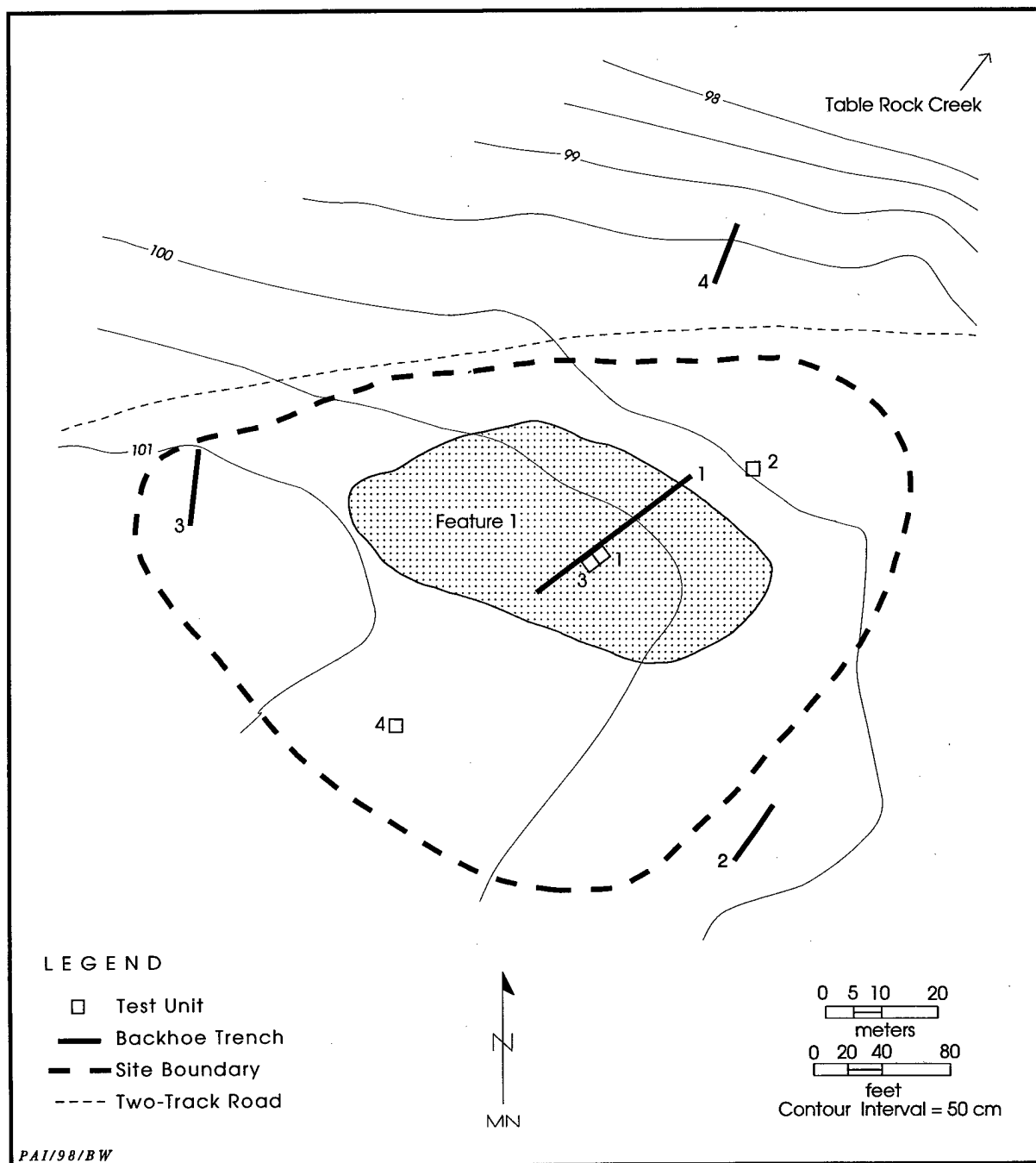


Figure 106. Site map, 41CV1133.

midden (Feature 1) and into dense fluvial gravels of an old channel of Table Rock Creek. This trench is presumed to have transected the apparent short axis of and the east-central portion of the midden (discussed below). Backhoe Trench 2 (12.0x1.5x3.5 m, oriented to 209°) was placed southeast of Backhoe Trench 1; the dense fluvial gravels were present only at the north end of this trench. Backhoe Trench 3 (14.0x1.5x3.7 m), placed west of Backhoe Trench 1 and oriented to 184°, was excavated deeply into the fluvial gravels. Backhoe Trench 4 (12.0x1.5x3.5 m) was placed north of Backhoe Trench 1 and oriented to 199°. A large quantity of burned rocks was exposed throughout Backhoe Trench 1, and a few burned rocks were exposed in the south end of Backhoe Trench 3, but no cultural materials were observed in Backhoe Trenches 2 or 4. The profiles of Backhoe Trenches 1, 3, and 4 were described and soil geomorphology was assessed.

Test Units 1 and 3 were placed as contiguous units along and oriented with the east wall of Backhoe Trench 1 and excavated 10 cm into the dense gravels below Feature 1 at 90 and 80 cm, respectively. Test Unit 2 was placed 10 m east of the northern end of Backhoe Trench 1 and excavated to boulders (not bedrock) and dense gravels at 100 cm. Test Unit 4 was placed ca. 30 m southwest of the southern end of Backhoe Trench 1 and excavated to dense gravels at 60 cm. Test Units 2 and 4 were oriented to magnetic north. Two charcoal radiocarbon dates were obtained on features (see Cultural Features), and a third charcoal sample from nonfeature cultural deposits at 79 cm in Test Unit 2 yielded a conventional radiocarbon age of 2900 ± 40 B.P. (Beta-102119; see Appendix A).

#### **Site Extent and Depth**

Site 41CV1133 covers an area of 140 m east-west by 95 m north-south. With the exception of the upper 20 cm of Test Unit 4, cultural artifacts were found in each level of each of the test units to a maximum depth of 100 cm.

#### **Sediments and Stratigraphy**

Site 41CV1133 rests on a terrace that consists of gravelly channel fill and muddy overbank facies of Fort Hood alluvium. Cultural materials and features are shallowly buried due to the accumulation of organic detritus and

anthropogenic processes. Backhoe trench profile descriptions characterize the anthropogenic deposits and the Fort Hood fill of the terrace (Figure 107). The profile of Backhoe Trench 1 consists of a 79-cm-thick anthropogenic deposit (Feature 1) and underlying deposit of Fort Hood alluvium (79–131+ cm). The anthropogenic deposit consists of many pieces of densely packed burned rocks within a matrix of black to very dark grayish brown silty clay loam and organic materials. An A-Bk soil profile is imprinted on the deposit. The feature rests on a yellowish brown very gravelly sandy clay, which represents a channel fill facies of the Fort Hood.

The profiles of Backhoe Trenches 3 and 4 revealed varying channel fill, channel margin, and overbank facies of the Fort Hood alluvium. The profile of Backhoe Trench 3 consists of a bed of rounded, clast-supported gravels in a brown to dark brown clay loam matrix (0–130 cm). The fluvial gravel bed is imprinted with an A-Bw soil. From 130–250 cm, four thin to medium clast-supported gravel beds were observed in a yellowish brown muddy fine sand. A 75+-cm-thick yellowish brown fine sandy clay loam was observed at the base of the profile. The 337-cm-thick profile of Backhoe Trench 4 is dominated by overbank facies of brown to dark brown loamy sediments. Yellowish brown sandy and gravelly channel fill facies are present at the base of the profile. The profile exhibits two soils. The upper soil consists of a 193-cm-thick A-Bwk-Bwk2-Bwk3-Ck profile. Secondary carbonate filaments and pendants throughout this soil are the result of the weathering of overlying thin gravel beds. This soil overlies a 60-cm-thick, truncated prismatic-structured 2Bwb horizon formed on a brown fine sandy clay loam. This soil overlies light yellowish brown sandy and gravelly channel fills.

#### **Cultural Materials**

Cultural artifacts recovered from the site include 344 flakes, 6,648 burned rocks (782.5 kg), 17 chipped stone tools including 2 untyped, 1 Untyped Group I, 1 Bulverde, and 2 Pedernales points; 4 ground stones; and 2 modified mussel shells (Table 47). Thirty-four percent (n = 142) of these artifacts were recovered from the burned rock midden (Feature 1). Faunal remains include 2 small bone fragments (see Appendix D) and 37 unmodified mussel shells.

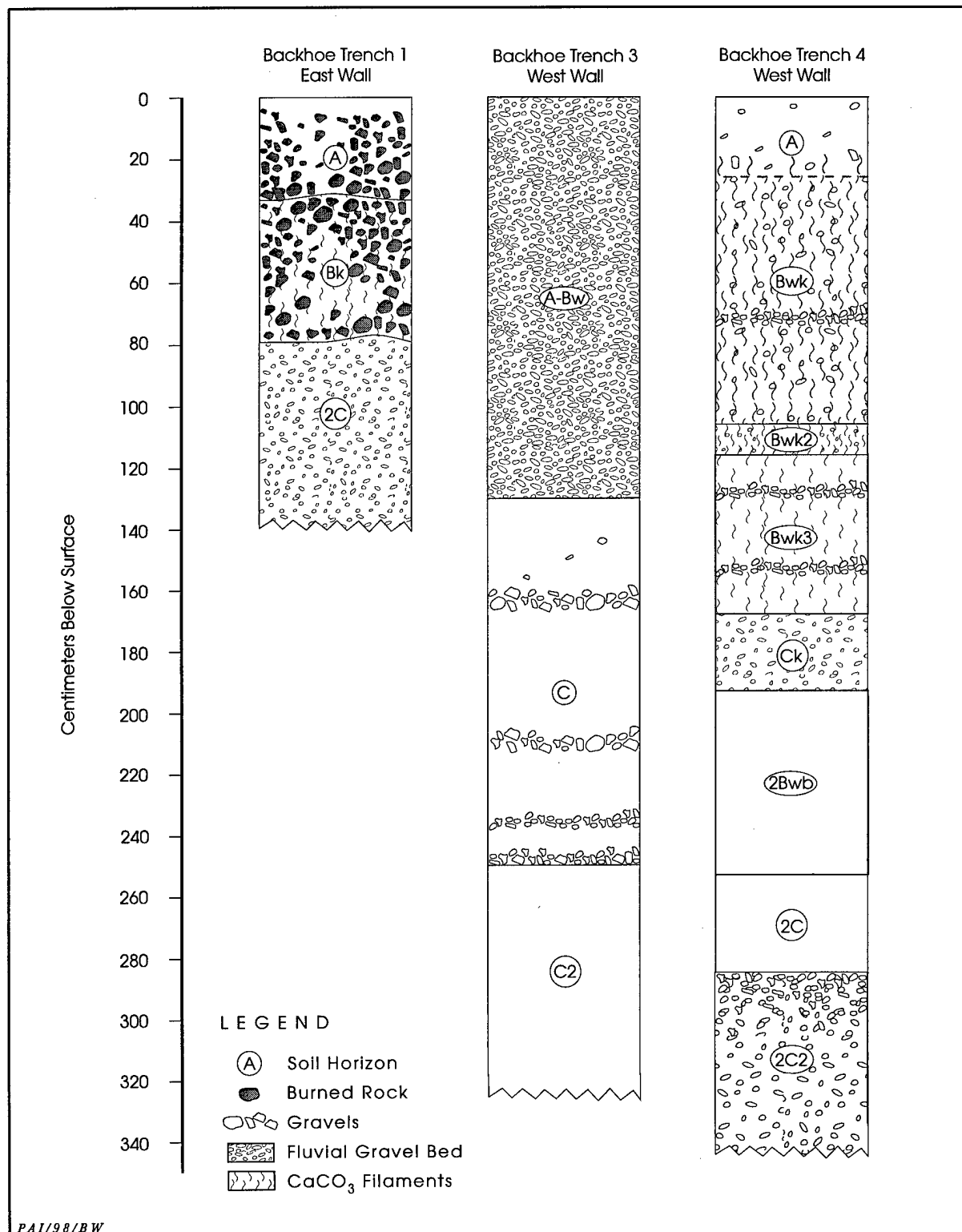


Figure 107. Profiles of Backhoe Trenches 1, 3, and 4, 41CV1133.

Table 47. Summary of cultural materials from 41CV1133

Provenience	Dart Points	Late-stage/ Finished Bifaces	Side Scraper	End/Side Scraper	Miscellaneous Unifaces	Edge-modified Flakes	Cores	Unmodified	Mano	Metates	Modified Shells	Unmodified Bones	Unmodified Shells	Totals
<b>TEST UNIT 1</b>														
Feature 1 (0-10 cm)	-	-	-	-	-	-	-	17	-	-	-	-	-	17
Feature 1 (10-20 cm)	-	-	1	-	-	-	-	2	-	-	-	-	-	3
Feature 1 (20-30 cm)	-	-	-	-	1	-	-	7	-	-	-	-	2	10
Feature 1 (30-40 cm)	-	-	-	-	-	-	1	10	-	-	-	1	-	12
Feature 1 (40-50 cm)	-	-	-	-	-	-	-	8	-	-	-	-	-	8
Feature 1 (50-60 cm)	-	-	-	-	-	-	-	4	-	-	-	-	-	4
Feature 1 (60-70 cm)	1	-	-	-	-	-	-	2	-	-	-	-	1	4
Feature 1 (70-80 cm)	-	-	-	-	-	-	-	3	-	-	1	-	1	5
Level 9 (80-90 cm)	-	-	-	-	-	-	-	9	-	-	-	-	2	11
Subtotals	1	0	1	0	1	0	1	62	0	0	1	1	6	74
<b>TEST UNIT 2</b>														
Level 1 (0-10 cm)	-	-	-	-	-	-	-	7	-	-	-	-	-	7
Level 2 (10-20 cm)	-	-	-	-	-	-	-	24	-	-	-	-	-	24
Level 3 (20-30 cm)	-	1	-	1	-	1	-	14	-	-	-	-	-	17
Level 4 (30-40 cm)	-	-	-	-	-	-	-	29	-	-	-	-	-	29
Level 5 (40-50 cm)	-	-	-	-	-	1	-	25	-	-	-	-	1	27
Level 6 (50-60 cm)	-	1	-	-	-	-	-	20	-	-	-	-	6	27
Level 7 (60-70 cm)	1	-	-	-	-	-	-	34	-	-	-	-	6	41
Level 8 (70-80 cm)	-	-	-	-	-	-	-	18	-	-	-	1	6	25
Level 9 (80-90 cm)	-	-	-	-	-	-	-	5	-	-	-	-	2	7
Level 10 (90-100 cm)	-	-	-	-	-	-	-	1	-	-	-	-	-	1
Subtotals	1	2	0	1	0	2	0	177	0	0	0	1	21	205
<b>TEST UNIT 3</b>														
Feature 1 (0-10 cm)	1	-	-	-	-	-	-	17	-	-	-	-	-	18
Feature 1 (10-20 cm)	-	-	-	-	-	-	-	19	-	-	-	-	-	19
Feature 1 (20-30 cm)	-	-	-	-	-	-	-	12	-	-	-	-	1	13
Feature 1 (30-40 cm)	-	-	-	-	-	-	-	7	-	-	-	-	1	8
Feature 1 (40-50 cm)	-	1	-	-	-	-	-	4	-	-	1	-	3	9
Feature 1 (50-60 cm)	-	-	-	-	-	-	-	2	1	-	-	-	1	4

Table 47, continued

Provenience	Dart Points	Late-stage/ Finished Bifaces	Side Scraper	End/Side Scraper	Miscellaneous Unifaces	Ridge-modified Flakes	Cores	Unmodified Debitage	Mano	Metates	Modified Shells	Unmodified Bones	Unmodified Shells	Totals
Feature 1 (60-70 cm)	-	-	-	-	1	-	-	4	-	-	-	-	-	5
Level 8 (70-80 cm)	-	-	-	-	-	1	-	7	-	-	-	-	2	10
Subtotals	1	1	0	0	1	1	0	72	1	0	1	0	8	86
TEST UNITS 1 and 3														
Feature 2 (10-34 cm)	0	0	0	0	0	0	0	27	0	2	0	0	0	29
TEST UNIT 4														
Level 4 (30-40 cm)	-	-	-	-	-	-	-	4	-	-	-	-	1	5
Level 5 (40-50 cm)	1	-	-	-	-	-	-	2	-	-	-	-	-	3
Level 6 (50-60 cm)	-	-	-	-	-	-	1	-	-	-	-	-	1	2
Subtotals	1	0	0	0	0	0	1	6	0	0	0	0	2	10
BACKHOE TRENCH 1														
Feature 1 (0-80 cm)	2	1	-	-	-	-	-	-	-	-	-	-	-	3
Feature 2 (10-34 cm)	-	-	-	-	-	-	-	-	-	1	-	-	-	1
Subtotals	2	1	0	0	0	0	0	0	0	1	0	0	0	4
Totals	6	4	1	1	2	3	2	344	1	3	2	2	37	408

### Cultural Features

Feature 1 is the large burned rock midden and Feature 2 is an internal hearth or cooking pit within the midden. Feature 1 is estimated to measure ca. 60 m east-west by 30 m north-south based on the extent of burned rocks scattered across the surface in the vicinity of the cedar-clearing depressions. The thickest portion of the midden (0–80 cm) and densest concentration of burned rocks was located at the midpoint of Backhoe Trench 1, where several relatively large tabular rocks formed a basin-shaped arrangement at 10–34 cm (Feature 2) in the east profile. From this point, midden thickness and burned rock density decreased toward both ends of the trench. Artifacts collected from the trench backdirt and probably associated with Features 1 and 2 included a Bulverde and a Pedernales point, a late-stage/finished biface, and a metate fragment. All of these chipped stone artifacts are complete items. The metate fragment is presumed to be associated with Feature 2 because it was found on the west edge of the trench just above Feature 2, it is relatively large compared to the burned rocks of the midden, and it refits with a metate fragment found in Feature 2 (see below).

Recovery from Feature 1 in Test Units 1 and 3 is very similar; 53 flakes, 2,880 burned rocks (284 kg), 1 Pedernales point, 1 core, 1 side scraper, 1 miscellaneous uniface, 1 bone fragment, 4 unmodified mussel shells, and 1 cut mussel shell recovered from Test Unit 1 from 0–80 cm, and 65 flakes, 3,097 burned rocks (295 kg), 1 untyped dart point, 1 late-stage/finished biface, 1 miscellaneous uniface, 1 mano, 6 unmodified mussel shells, and 1 perforated mussel shell recovered from Test Unit 3 from 0–70 cm (see Table 47). Burned rock density peaked at 50–60 cm, where 590 (88.5 kg) rocks were recovered from Test Unit 1 and 801 (89.5) rocks were recovered from Test Unit 3. A radiocarbon age of  $3280 \pm 40$  B.P. (Beta-102121; see Appendix A) was obtained on charcoal collected in a flotation sample near the base of the midden at 60–70 cm. The Pedernales dart point

also was found at this depth. Six flotation samples submitted for macrobotanical analysis did not contain charred plant remains (see Appendix E).

Feature 2 is a large rock-lined pit located within Feature 1 matrix from 10–34 cm (Figure 108). Several large, intact tabular slabs defined the outer perimeter of the excavated portion of the feature (164x94-cm area). Because no large rocks were observed in the west profile of Backhoe Trench 1, it is assumed that the western one-third to one-half of the feature was removed during trenching. The size of the complete pit is estimated to have been about 160 cm in diameter. Once two to three layers of fractured rocks were removed from the central portion of the feature, the base was observed to be lined with one to two layers of intact slabs and slabs fractured in situ. Of the 409 burned rocks (184.5 kg) recovered from the feature, 59 (110.5 kg) comprised the basal lining (14 percent by count; 60 percent by weight). One of the base slabs exhibited grinding, and a second metate fragment found along the outer east edge of Feature 2 refits with the metate fragment recovered from the west edge of the trench. The feature matrix also produced 27 flakes. Charcoal from the feature matrix yielded a conventional radiocarbon age of  $1160 \pm 40$  B.P. (Beta-102120; see Appendix A). One flotation sample submitted for macrobotanical analysis contained charred



**Figure 108.** Feature 2, 41CV1133. View is to the southeast of burned rocks exposed in the east wall of Backhoe Trench 1 and at 20 cm below surface in Test Units 1 and 3.

wood of an indeterminate hardwood and *Quercus* sp. (see Appendix E).

### Discussion

Three calibrated radiocarbon dates define the age of the cultural activities at 41CV1133. A date of 1605–1505 B.C. was obtained on charcoal from near the base of the burned rock midden (Feature 1), while a date of A.D. 865–960 was obtained on charcoal from the internal hearth or cooking pit (Feature 2) in the upper portion of the midden. A third date of 1130–1005 B.C. was obtained on nonfeature charcoal from cultural deposits at 79 cm in Test Unit 2. These three dates suggest that most of the midden accumulation and other cultural activities occurred during the Late Archaic period, but that these activities continued into the Late Prehistoric period (Austin phase). Two observations made at other burned rock middens on Fort Hood (e.g., at 41BL155 in Mehalchick et al. 1999) hold true for 41CV1133. First, the burned rock midden at 41CV1133 is horizontally extensive and probably represents an accumulation from multiple internal cooking pits rather than a single central pit as seen in smaller burned rock mounds. Second, the internal pit feature at 41CV1133 was discovered because its base was lined with large slabs (some are fractured in place but many are intact) that are considerably larger than the ubiquitous angular burned rocks that comprise the matrix of the larger midden.

Site 41CV1133 contains an intact burned rock midden (Feature 1). It is one of the few burned rock middens on Fort Hood that has not been severely vandalized. Excavation results demonstrate that at least one intact internal feature (Feature 2) is present, and the potential for others is considered to be high. In sum, the site has considerable potential to provide substantial data on burned rock midden formation and function and associated activities surrounding such features. It is recommended that 41CV1133 be considered eligible for listing in the NRHP.

### 41CV1137

#### Site Setting

Site 41CV1137 is situated on Pleistocene- and Holocene-age terraces south of Table Rock Creek (Figure 109). Both terraces are primarily

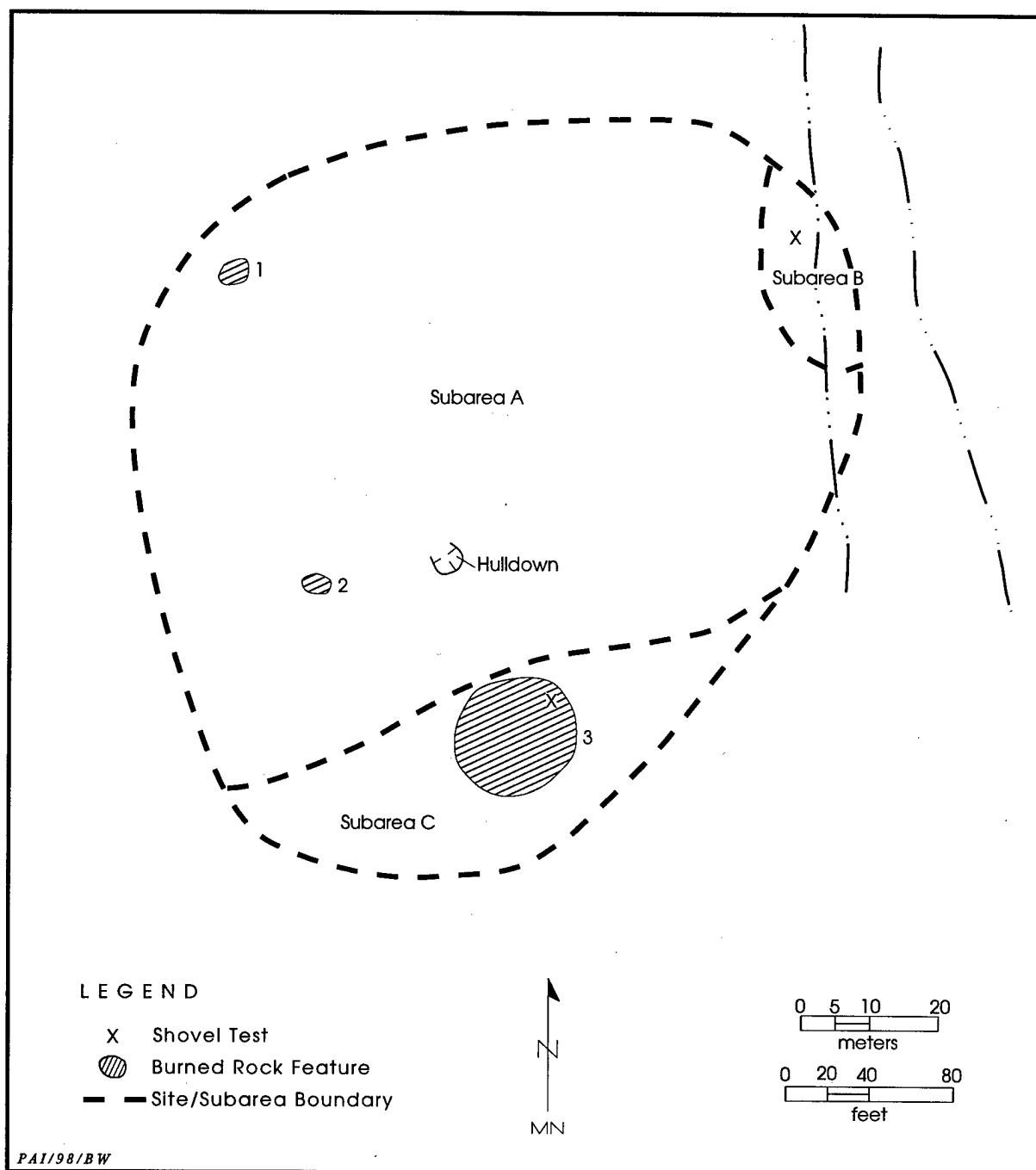
open and covered with grasses; however, scattered stands of live oak and juniper are present. Disturbances include vegetation clearing, military activity, and sheet erosion (particularly on the higher terrace), and deep erosional gullies adjacent to the eastern site margin. Site elevation is 230 m above mean sea level.

### Previous Work

On 14 August 1985, Mesrobian and Turpin (Texas A&M University) recorded the site. Burned rocks and debitage were eroding along a tank trail and gully, with some of the cultural materials redeposited downslope. One Martindale point was surface collected. Site dimensions were 115 m north-south by 110 m east-west. An estimated 60 percent of the site was disturbed by tank trails, tracked vehicles, bulldozing, and erosion.

Mehalchick, Kleinbach, Turpin, Frederick, and Abbott (Mariah Associates) revisited the site on 2 September 1992. Based on geomorphic contexts, the site was divided into three subareas. Encompassing the northern two-thirds of the site, Subarea A consisted of a broad, sloping Pleistocene-age terrace 12–18 m above the modern channel. Based on the character of the soil horizons at the surface and the geometry of the underlying bedrock, it appeared that the Pleistocene fill represented two distinct episodes of alluvial deposition separated by an erosional unconformity. However, erosive beveling of the fills eliminated all traces of a scarp separating the two. A relatively thick soil with an A-Btk-Bk horizon sequence was noted. Located along the western margin of the subarea, Features 1 and 2 were identified as deflated burned rock concentrations measuring 2–3 m in diameter. Although burned rocks and lithic artifacts were noted across the surface, these cultural materials were in a secondary context. Since Subarea A consisted of a stable to degrading terrace, subsurface testing was not warranted and no further management was recommended.

The original site boundary was slightly expanded to the northeast to include Subarea B, a small (30x15 m) wedge of a much larger Holocene alluvial terrace. A gully exposure revealed approximately 2 m of early to middle Holocene deposits characterized by sandy to loamy alluvium and exhibiting an A-Bw-BC-C sequence. Burned rocks and debitage were



**Figure 109.** Site map, 41CV1137 (modified from Trierweiler, ed. 1994:A1275).

scattered across the surface. Based on the potential for buried cultural deposits in Subarea B, shovel testing was recommended.

Along the southern (upslope) site boundary, Subarea C consisted of a thin apron of fine-grained colluvial slopewash overlying the higher

**Pleistocene terrace.** Feature 3, a burned rock concentration with associated lithic artifacts, covered an area approximately 20 m in diameter. Since this subarea could contain buried archeological materials, shovel testing was recommended.



On 13 October 1992, a crew excavated two shovel tests. One shovel test in Subarea B was culturally sterile to 40 cm. In Subarea C, a shovel test placed on Feature 3 yielded one flake and a burned rock from 0–10 cm. No cultural materials were found from 10–40 cm, and a soil color change from gray to reddish brown was noted at 10 cm.

Based on the shovel testing results, Subarea C contained shallow deposits with minimal potential for intact cultural materials. No further management was recommended. Since the alluvial deposits in Subarea B were up to 2 m thick, a potential for deeply buried cultural deposits existed. A minimum testing effort of two backhoe trenches was recommended to determine the NRHP eligibility of Subarea B (Trierweiler, ed. 1994:A1274–A1276).

### **Work Performed**

On 18 July 1996, Prewitt and Associates completed formal testing of Subarea B of 41CV1137. As originally defined in 1992, Subarea B included only a small section of the Holocene terrace. However, the entire terrace had potential for containing buried cultural deposits. Thus, the overall site boundary was expanded by extending Subarea B 170 m north toward Table Rock Creek (Figure 110). Within this enlarged Subarea B, test excavations consisted of two backhoe trenches and one 1x1-m test unit. A total of 2.5 m<sup>3</sup> was manually excavated.

Excavated about 75 m south of and perpendicular to Table Rock Creek, Backhoe Trench 1 was oriented to 350° and measured 15.0x1.5x3.5 m. Approximately 100 m south of Backhoe Trench 1, Backhoe Trench 2 was placed at the southern margin of Subarea B, west of and perpendicular to an erosional gully. Oriented to 45°, the trench had dimensions of 14.0x1.5x3.0 m. No cultural materials were observed in either trench.

Due to heavy rains, the walls of Backhoe Trench 2 collapsed prior to manual excavation. Therefore, Test Unit 1 was excavated along the west wall of Backhoe Trench 1 to 250 cm.

### **Site Extent and Depth**

As redefined in the current excavation, 41CV1137 extends ca. 120 m east-west by 280 m north-south. The Holocene-age terrace defined as Subarea B is delimited by Table Rock Creek

to the north and the higher Pleistocene terrace to the south, and extends approximately 30 m east-west and 210 m north-south. Due to the paucity of cultural materials recovered in Test Unit 1, it appears that no discrete cultural occupations are present in Subarea B.

### **Sediments and Stratigraphy**

The two backhoe trenches exhibit similar profiles, consisting of Fort Hood alluvium overlying a truncated Georgetown alluvial fill. This sequence is consistent with the stratigraphy described by Nordt (1992) for the T<sub>1a</sub> terrace fills of Table Rock Creek. Backhoe Trench 1 revealed a 144-cm-thick Fort Hood alluvium imprinted with an A-Btk soil profile. The A horizon is a yellowish brown clay loam, while the Btk horizon is a brown clay with common CaCO<sub>3</sub> nodules. The underlying Georgetown fill (144–287+ cm) is truncated and imprinted with a 2Bb-2Btb soil profile. The 2Bb horizon is a light yellowish brown very gravelly silty clay loam, while the 2Btb horizon is a light yellowish brown fine sandy clay loam.

The profile of Backhoe Trench 2 consists of Fort Hood alluvium overlying a truncated Georgetown fill. The Fort Hood fill (0–185 cm) exhibits an A-Bw horizon. The A horizon is a dark brown clay loam, while the Bw horizon is a strong brown silty clay loam. The underlying Georgetown fill (185–220+ cm) represents a truncated soil (2Btb horizon) consisting of a light yellowish brown fine sandy clay loam.

### **Cultural Materials**

Cultural materials were found only in the Fort Hood fill of Test Unit 1. These consisted of one edge-modified flake in Level 3, one flake each in Levels 5 and 14, and one small burned rock each in Levels 3, 6, and 11.

### **Discussion**

Testing results indicate that cultural materials within the Fort Hood alluvium are sparse, and no isolable cultural components were encountered. These findings indicate that archeological materials are buried in the alluvial sediments but are too sparse to be interpretable. It is recommended that 41CV1137 be considered not eligible for listing in the NRHP.

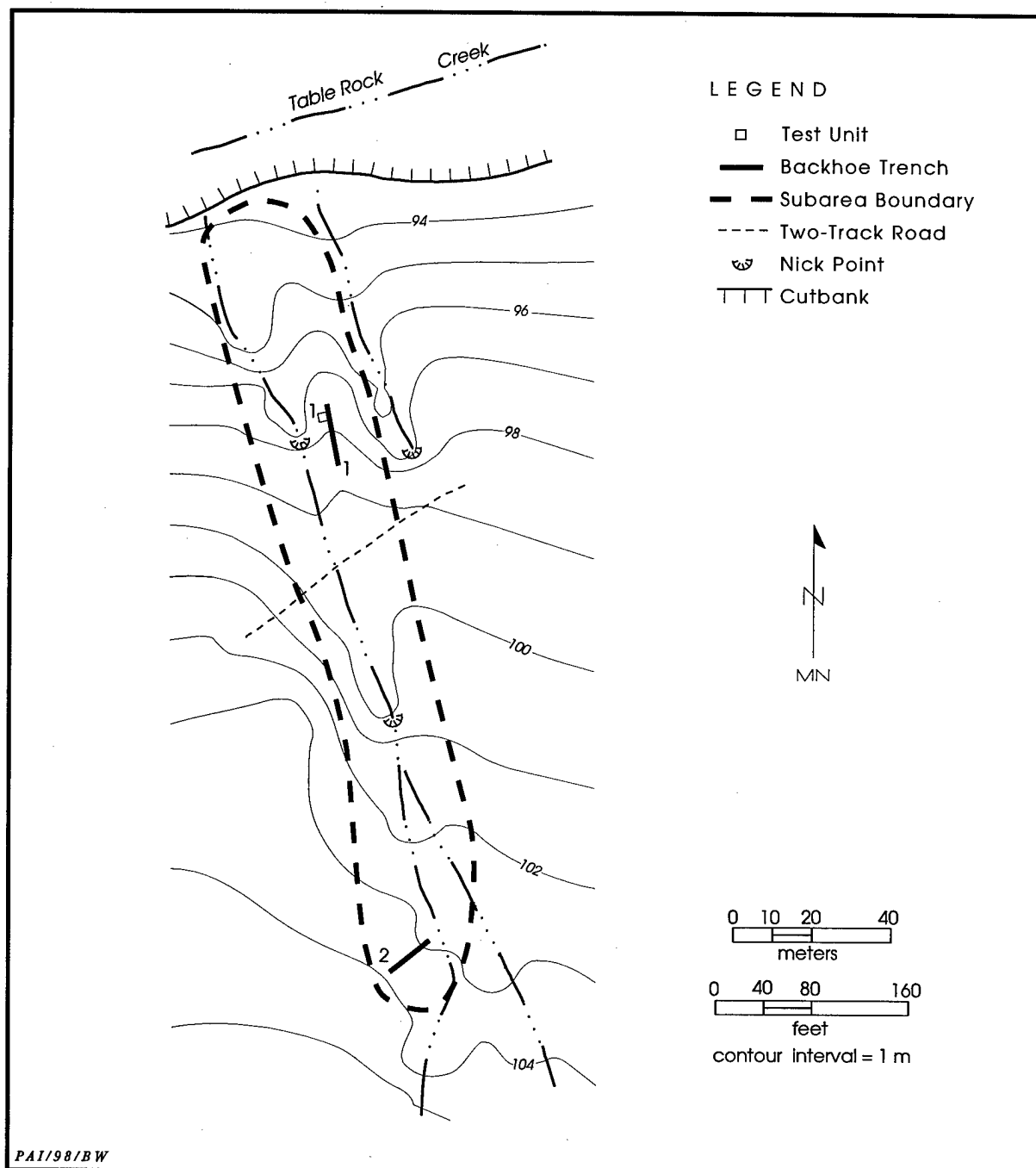


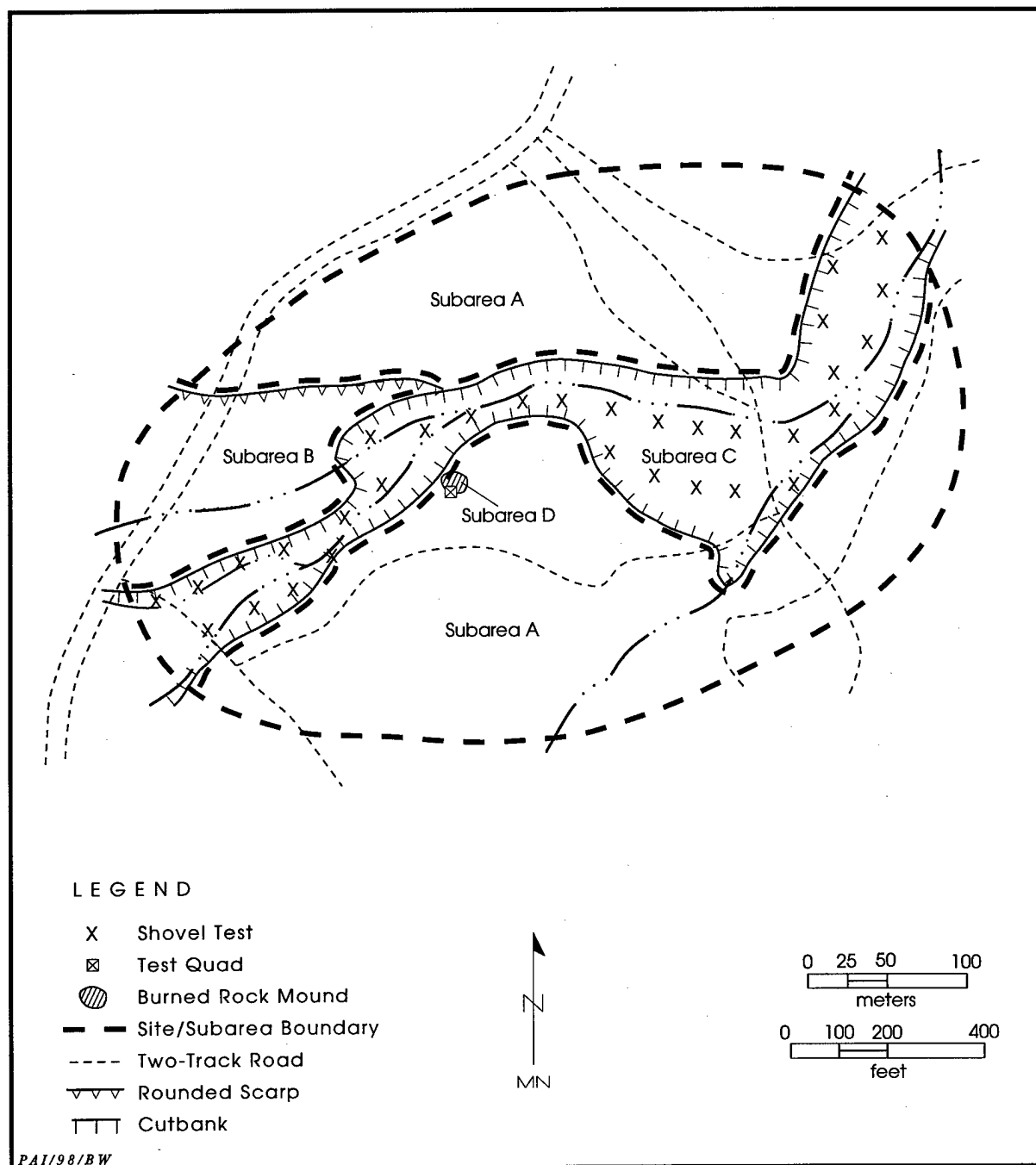
Figure 110. Map of Subarea B, 41CV1137.

#### 41CV1206

##### Site Setting

The site is an open camp encompassing a considerable expanse of an unnamed tributary

valley of Cowhouse Creek (Figure 111). It includes the alluvial terraces and valley walls on both sides of the tributary. Few roads bisect the site, which is covered by dense vegetation consisting of an oak-juniper woodland and a thick under-story. The surface is virtually obscured by leaf



**Figure 111.** Site map, 41CV1206 (modified from Trierweiler, ed. 1994:A1347).

litter, grasses, greenbrier, and poison ivy. Site elevation is 220–230 m above mean sea level.

#### Previous Work

This site was first recorded by Davis,

Dureka, and Mesrobian (Texas A&M University) on 12 May 1986. The site measured 575x300 m and consisted of several discontinuous burned rock scatters and one burned rock mound. Most of the burned rock scatters were located on an erosional upland slope. Flakes and bifaces were

also noted across the site surface. An Ellis and two untyped dart points, a drill, a biface, and a mano were collected; ca. 66 percent of the site was disturbed by erosion, vehicular traffic, and vandalism. Due to its large size, 41CV1206 was subsequently classified as a lithic resource procurement area (LRPA) for management purposes.

Kleinbach and Abbott (Mariah Associates) revisited the site on 27 May 1993. Site dimensions were slightly modified to 500x350 m, and the site was divided into four subareas based on differing geomorphic contexts and archeological potentials. The site's research potential relative to questions of lithic resource procurement and reduction also was evaluated. Since no naturally occurring chert was observed on-site, it was excluded from resurvey.

Three geomorphic contexts were defined within the site boundary: the moderately to steeply sloping, stepped bedrock valley walls (Subarea A); a broad, gently sloping, discontinuous late Pleistocene terrace (Subarea B); and a relatively narrow Holocene-age alluvial terrace ( $T_1$ ) that contains a very narrow, discontinuous modern floodplain (Subarea C). The burned rock mound identified by the previous investigators was re-located within Subarea A. The mound was designated Feature 1, Subarea D based on its archeological potential for containing intact cultural deposits.

Subarea A was mantled with a thin, discontinuous A horizon that was highly erosional on the steeper slopes. The slope grades ranged from nearly level midslope benches to steep (70°) inclines, particularly in areas where the stream had previously meandered against the valley wall. The majority (if not all) of the limestone rocks observed at previously identified burned rock scatter loci were determined to be gray in color either naturally or due to range fires; they did not exhibit internal heat alteration (i.e., fracturing). The subarea was impacted by tracked and wheeled vehicle traffic, erosion, blading, tree clearing, and sheet erosion. Few flakes were observed across the subarea.

Subarea B was defined as a broad, gently inclined constructional surface at the upstream end of the site. A 40–60-cm exposure in an incised roadcut revealed a highly rubified A-Bw-C profile developed in a thin drape of sandy clay loam over fluvial/colluvial gravels. Structural development in the B horizon was weak, and no secondary carbonates were observed. Research-

ers noted that the surface could represent a fine-grained colluvial facies, but it more likely represented a Pleistocene terrace.

Within Subarea C, the  $T_1$  terrace was estimated to lie 3–4 m above the modern stream. The deposits exposed in cutbanks consisted of a thin (<50 cm) cumelic A horizon composed of dark grayish brown gravelly clay loam over thick sandy loams to gravelly sands. A weak structural B horizon was observed to be commonly developed at the top of the sands, resulting in an A-Bw-C profile. The fill was thought to be roughly equivalent to the West Range alluvium (Nordt 1992), but its uncharacteristically sandy texture indicated that extensive outcrops of Paluxy sandstone were present upstream. The steep valley walls also contributed colluvial and slopewash sediments to the terrace. The gravelly floodplain ( $T_0$ ) was estimated to lie 1–2 m above the stream. No cultural materials were observed on the surface or within cutbank exposures.

Feature 1 (Subarea D) was described as a 10-m-diameter burned rock mound situated just south of the tributary. The feature was comprised of angular burned rocks and exhibited 40–50 cm of relief above the surrounding ground surface. No central depression was observed. Flakes and a few cores were observed adjacent to the feature, which was extensively disturbed by juniper growth, erosion, and possibly vandalism.

The results of this reconnaissance indicated that the highly eroded bedrock surfaces and Pleistocene-age deposits in Subareas A and B had an extremely limited potential for containing intact cultural deposits. No further work was recommended for these subareas. However, all of Subarea C (Holocene terrace) and the burned rock mound (Feature 1) comprising Subarea D were considered to have the potential for intact deposits; shovel testing was recommended for these two subareas.

On 1 June 1993, a crew excavated 32 shovel tests in Subarea C to a maximum depth of 40 cm and one 50x50-cm test quad to 50 cm in Subarea D. No cultural materials were found in any of the 32 shovel tests excavated in Subarea C. The test quad was placed near the center of Feature 1, and large quantities of burned rocks were found from 0–45 cm. A single flake was found at 0–10 cm. Based on these subsurface explorations, Subarea D was determined to be of limited significance due to the low artifact return and extensive amount of disturbance. No further

work was recommended for Subarea D. Although no archeological potential was demonstrated for the upper 40 cm of Subarea C, the potential existed for deeply buried cultural deposits of unknown significance below the limits of testing. The recommended testing effort included a minimum of two backhoe trenches and 2–4 m<sup>2</sup> of manually excavated test units in Subarea C (Trierweiler, ed. 1994:A1346–A1348).

### Work Performed

On 10 June 1996, Prewitt and Associates

conducted formal testing of Subarea C at 41CV1206 (Figure 112). The test excavations included three backhoe trenches (Backhoe Trenches 1–3) and three 1x1-m test units (Test Units 1–3). A total of 4.1 m<sup>3</sup> was manually excavated.

On the north side of the tributary, Backhoe Trench 1 (17.0x0.8x1.1 m, oriented to 45°) was placed near the eastern site margin. Backhoe Trench 2 (16.0x0.8x1.8 m, oriented to 5°) was excavated perpendicular to the tributary across the central portion of the southern terrace. No cultural materials were observed within either

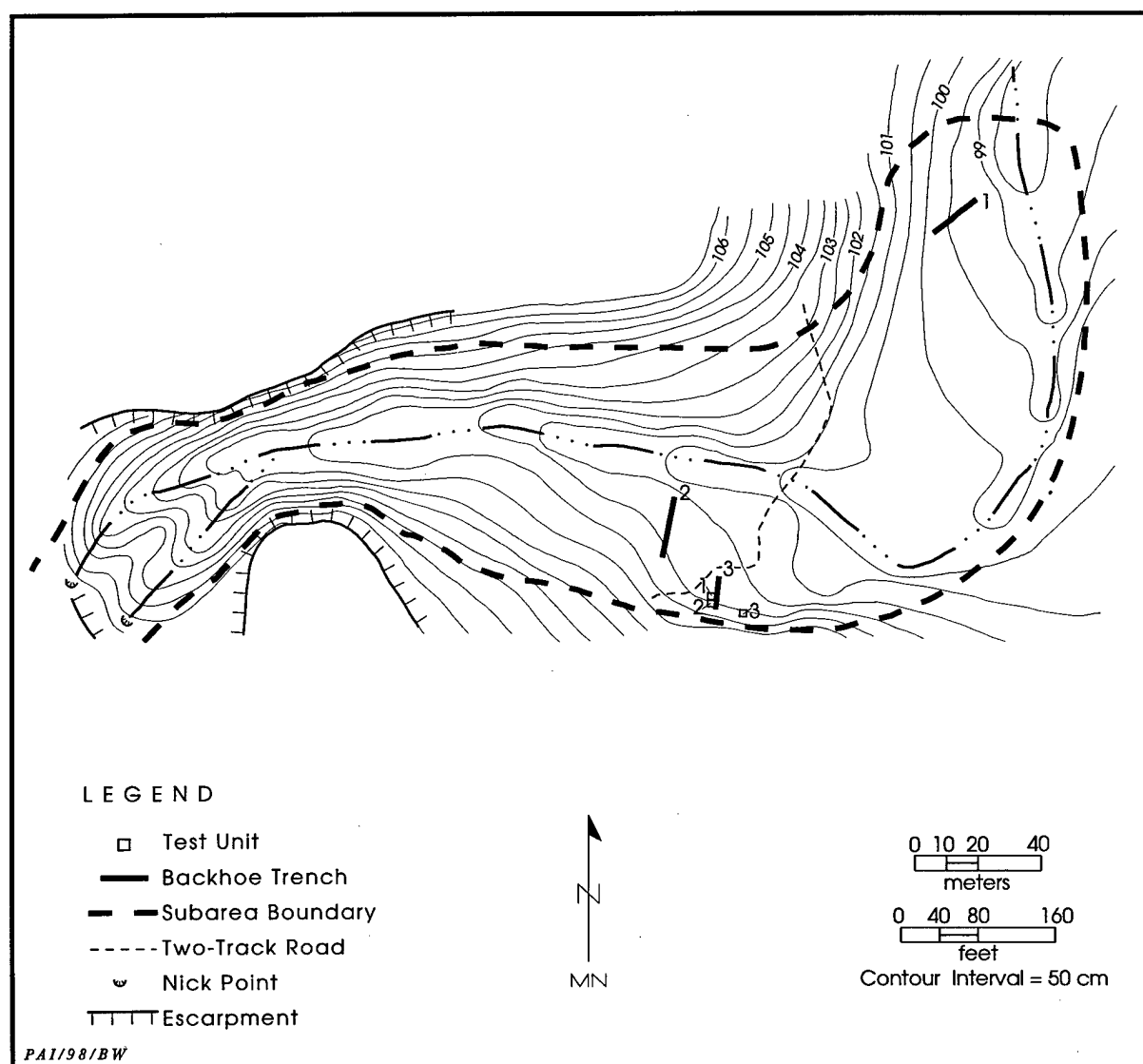


Figure 112. Map of Subarea C, 41CV1206.

trench. Placed east of Backhoe Trench 2, Backhoe Trench 3 (10.0x0.8x2.0 m, oriented to 10°) was excavated from the base of the toeslope out onto the terrace. A large, basin-shaped rock cluster was bisected during trenching. Located at the upslope (south) end of the trench, this feature was exposed in the east and west walls at ca. 2 m below surface. To facilitate the excavation of this large feature, the upper 1.2 m of fill directly above the hearth remnant in the west wall was removed by the backhoe.

Test Units 1 and 2 are contiguous units excavated on the safety bench of Backhoe Trench 3 directly above the exposed hearth in the west wall. Since the upper 120 cm of deposit was intentionally removed by the backhoe, the excavations began at Level 13 (120–130 cm). Dense gravels were encountered at 220 cm in Test Unit 1 and at 200 cm in Test Unit 2, at which point the excavations were terminated. Test Unit 3 was placed approximately 10 m east of Test Units 1 and 2. It was oriented to magnetic north, and its excavation was arbitrarily terminated at 210 cm.

#### **Site Extent and Depth**

The width of the Subarea C alluvial terrace is defined by the valley walls, but the tributary and its associated terraces continue farther upstream and downstream for unknown distances. Based on the previous investigations, surficial cultural materials, and the testing results, the maximum horizontal extent of Subarea C is 310 m east-west by 150 m north-south. Buried cultural components are represented by intact features at 185–203 and 195–219 cm in Test Units 1 and 2.

#### **Sediments and Stratigraphy**

The sediments and stratigraphy in Subarea C of 41CV1206 consist of a terrace fill of loamy and gravelly alluvium and colluvium equivalent to Nordt's (1992) Ford, upper West Range, and Fort Hood depositional units (Figure 113). The 73-cm-thick profile of Backhoe Trench 1 consists of late Holocene alluvium resting on a strath of weathered Glen Rose limestone (see Appendix B). The alluvium is believed to be equivalent to the upper West Range and/or Ford alluvium. It is imprinted with an A-Bw soil profile. The A horizon is 14 cm thick and consists of a very dark

grayish brown clay loam. The underlying Bw horizon (14–40 cm) is a dark brown clay loam.

The 203-cm-thick profile of Backhoe Trench 2 consists of interbedded dark loamy and gravelly alluvium. Two soils (A-Bw-Bw2-2Abk-2Bwb-2C profile) were observed in the profile. A bulk soil sample was collected from the 2Abk horizon at 101–110 cm. Soil humates from the sample yielded a conventional radiocarbon age of  $1140 \pm 60$  B.P. (Beta-102124; see Appendix A). The radiocarbon age indicates that the buried soil (2Abk-2Bwb-2C profile, 88–203+ cm) formed on alluvium equivalent to the upper West Range (it is believed the upper soil formed on Ford alluvium). The gravelly texture of the upper West Range deposit in Backhoe Trench 2 is not typical of the upper West Range alluvium in larger stream valleys. Given the location of site 41CV1206 in the upper end of the drainage basin, it is not surprising that the sorting of clasts is incomplete. This suggests that the more typical fine-grained upper West Range deposits in the larger stream valleys grade into more-gravelly facies in the low-order tributaries of the watershed. It is also interesting to note the apparent absence of deposits equivalent to the lower West Range in this small upland valley. This may indicate that the competence level of the smaller high-gradient, low-order tributaries was great enough to flush their valleys and transport large gravelly bedloads to the trunk streams during the period of lower West Range deposition.

The 240-cm-thick profile of Backhoe Trench 3 consists of interfingering gravelly colluvium and loamy alluvium. It is believed that the observed alluvial deposits are equivalent to the Ford and Fort Hood alluvial units and are separated by tongues of gravelly colluvium shed from the valley walls. The 53-cm-thick mantle of Ford alluvium is imprinted with a very dark gray clay loam A horizon. Underlying Bw and Bwk horizons (53–134 cm) formed on late Holocene-age gravelly colluvium. These colluvial valley margin facies overlie a brown to dark brown clayey to loamy alluvium imprinted with a 2Ab horizon. Encapsulated in this deposit are two cultural features (see Cultural Features below) containing charcoal. Calibrated age ranges of radiocarbon assays on feature charcoal indicate the alluvial deposit is equivalent to the Fort Hood alluvium. While it appears that much of the small valley was scoured following the interval

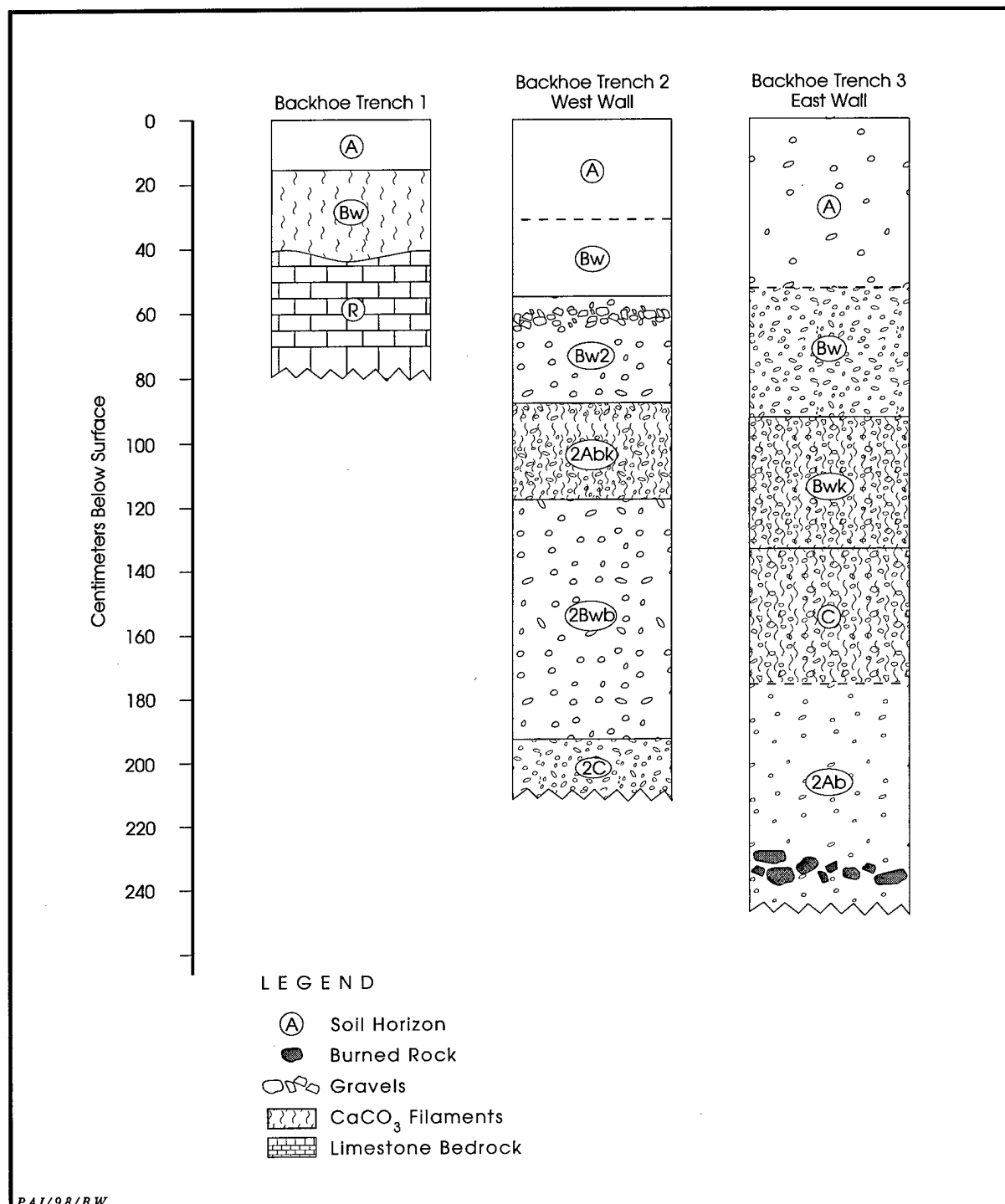


Figure 113. Profiles of Backhoe Trenches 1-3, 41CV1206.

of Fort Hood deposition, deposits antecedent to this scouring may be preserved along the valley margins under thick colluvial wedges.

### Cultural Materials

In contiguous Test Units 1 and 2, all 18

excavated levels produced cultural materials consisting of 154 burned rocks (45.75), 1 edge-modified flake, 5 unmodified mussel shells, and 17 flakes (Tables 48 and 49). Some of these prehistoric remains are probably associated with Features 2 and 3 (see Cultural Features).

Only 6 (28.6 percent) of 21 levels excavated in Test Unit 3 were positive. The cultural materials consisted solely of sparse burned rocks found at 10–30 cm and 160–200 cm.

### Cultural Features

Feature 2 (a hearth) was encountered from 185–203 cm in Test Units 1 and 2. Maximum excavated dimensions are 140 cm north-south by 65 cm east-west, with almost two-thirds of the hearth contained in Test Unit 1 (Figure 114a). Based on the exposures afforded by the test units and backhoe trench, the hearth is estimated to have been about 1.5 m in diameter. Comprised

of 83 burned rocks (85.5 kg), the excavated portion of the hearth was semicircular and basin shaped, with all of the rocks sloping toward the feature's center. The central portion of the feature consisted of two layers of rock, whereas the outer perimeter was comprised of only one. The overwhelming majority of rocks were large and ranged from 10x10x10 cm (blocky and tabular) to 29x23x7 cm (slabs) in size. Several rocks were cracked in situ. No artifacts were found in the feature matrix. Charcoal from the hearth yielded a conventional radiocarbon age of  $4110 \pm 50$  B.P. (Beta 102122, see Appendix A). A flotation sample collected at 185–196 cm produced no carbonized plant remains (see Appendix E). A second flotation sample not submitted for macrobotanical analysis contained sparse amounts of microdebitage and microfauna.

Immediately below Feature 2, the western portion of another large basin-shaped hearth

Table 48. Summary of cultural materials from 41CV1206

Provenience	Edge-modified Flake	Unmodified Debitage	Unmodified Shells	Totals
<b>TEST UNIT 1</b>				
Level 13 (120–130 cm)	–	–	–	0
Level 14 (130–140 cm)	1	1	–	2
Level 15 (140–150 cm)	–	1	–	1
Level 16 (150–160 cm)	–	1	–	1
Level 17 (160–170 cm)	–	1	2	3
Level 18 (170–180 cm)	–	–	2	2
Level 19 (180–190 cm)	–	3	–	3
Level 20 (190–200 cm)	–	–	–	0
Level 21 (200–210 cm)	–	–	–	0
Level 22 (210–220 cm)	–	1	–	1
Subtotals	1	8	4	13
<b>TEST UNIT 2</b>				
Level 13 (120–130 cm)	–	–	–	0
Level 14 (130–140 cm)	–	–	–	0
Level 15 (140–150 cm)	–	3	–	3
Level 16 (150–160 cm)	–	3	–	3
Level 17 (160–170 cm)	–	2	–	2
Level 18 (170–180 cm)	–	–	–	0
Level 19 (180–190 cm)	–	–	1	1
Level 20 (190–200 cm)	–	1	–	1
Subtotals	0	9	1	10
<b>TEST UNITS 1 AND 2</b>				
Feature 3 (196–219 cm)	0	2	0	2
<b>Totals</b>	<b>1</b>	<b>19</b>	<b>5</b>	<b>25</b>



**Table 49. Distribution of burned rocks, 41CV1206**

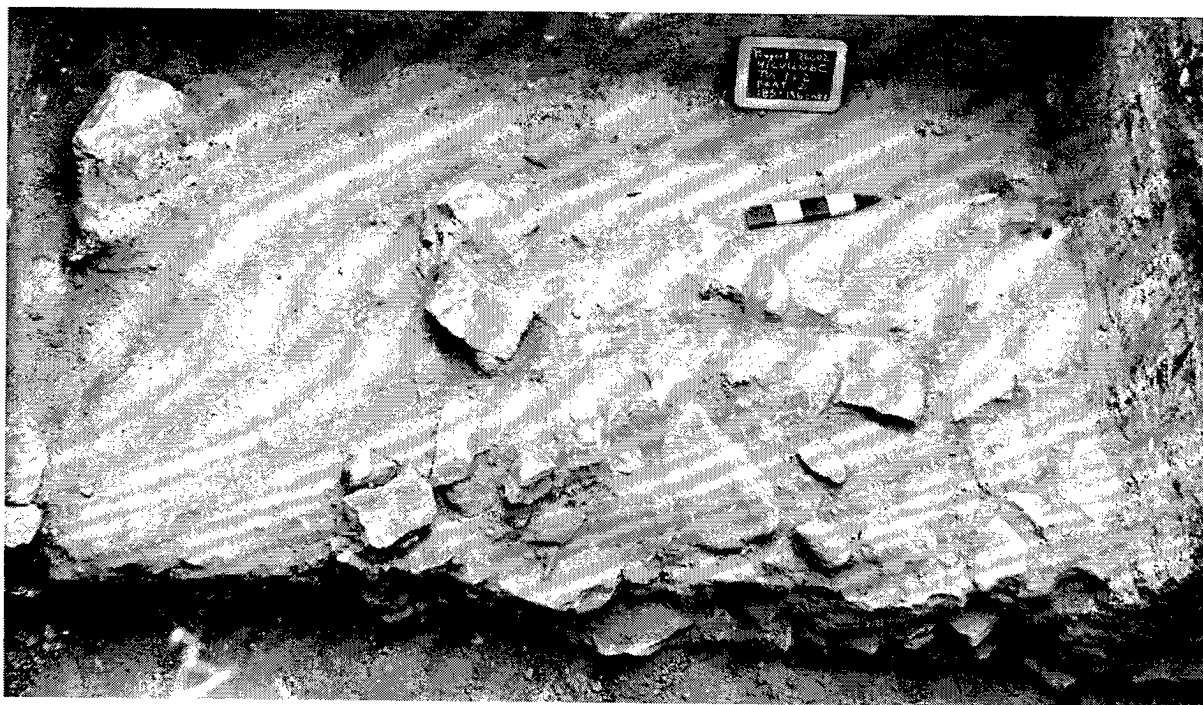
Provenience	Burned Rock Counts	Burned Rock Weights
<b>TEST UNITS 1 and 2</b>		
Level 13 (120–130 cm)	25	3.25
Level 14 (130–140 cm)	16	4.50
Level 15 (140–150 cm)	8	5.50
Level 16 (150–160 cm)	29	7.00
Level 17 (160–170 cm)	19	3.00
Level 18 (170–180 cm)	10	1.25
Level 19 (180–190 cm)	24	15.25
Level 20 (190–200 cm)	14	3.00
Feature 2 (185–203 cm)	83	85.50
Feature 3 (196–219 cm)	53	86.00
<b>TEST UNIT 1</b>		
Level 21 (200–210 cm)	5	1.50
Level 22 (210–220 cm)	4	1.50
<b>TEST UNIT 3</b>		
Level 2 (10–20 cm)	1	0.25
Level 3 (20–30 cm)	1	0.25
Level 17 (160–170 cm)	3	0.25
Level 18 (170–180 cm)	4	0.25
Level 19 (180–190 cm)	4	0.50
Level 20 (190–200 cm)	6	0.25

(Feature 3) was encountered from 196–219 cm in Test Units 1 and 2 (Figure 114b). A few centimeters of soil separated the central and southern portions of the two features, but they blended together along the northeastern periphery (Figure 115). The maximum excavated portion of Feature 3 measured 137 cm north-south by 90 cm east-west, with two-thirds of the hearth located in Test Unit 1. Based on the test unit excavations and exposed burned rocks in the trench walls, the complete hearth is estimated to be 2 m in diameter. The hearth was comprised of two imbricated layers of burned rocks ( $n = 53$ , 86 kg). Most of the limestone rocks were either large slabs (up to 35x26x6 cm) or slightly smaller, tabular pieces. One rock lining the southern edge of the hearth measured 57x24x16 cm and weighed approximately 25 kg. This slab exhibited thermal alteration only on its top surface.

Approximately 30 rocks were angular, blocky fragments measuring about 5x5x5 cm. As with Feature 2, a few of the rocks comprising Feature 3 were fractured in situ. The base of Feature 3 was lying directly on, and appears to have been slightly intrusive into, the underlying gravel layer. Two flakes were recovered from the feature fill, and charcoal yielded a conventional radiocarbon age of  $4120 \pm 50$  B.P. (Beta 102123, see Appendix A). A flotation sample collected at 196–219 cm contained only indeterminate wood (see Appendix E). Another flotation sample not submitted for macrobotanical analysis contained a low frequency of charred wood.

### Discussion

The test results demonstrate that intact cultural deposits, buried in the Fort Hood alluvium, are preserved within a narrow tributary valley of Cowhouse Creek. Calibrated charcoal radiocarbon dates of 2865–2580 B.C. and 2865–2585 B.C. (see Appendix A) for Features 2 and 3, respectively, indicate utilization of the area during the Middle Archaic period. While these two dates are virtually identical, the partial vertical separation of the features suggests that these superimposed hearths or cooking pits represent different use episodes. Although sparse cultural materials were found in, or associated with, the hearths, the occurrence of mussel shells implies exploitation of an aquatic resource, and organic remains were preserved in each feature. Based on the foregoing, Subarea C of 41CV1206 is considered significant and recommended as eligible for listing in the NRHP.



a



b

**Figure 114.** Plan views to the west of (a) Feature 2 and (b) Feature 3 in Test Units 1 and 2, 41CV1206.

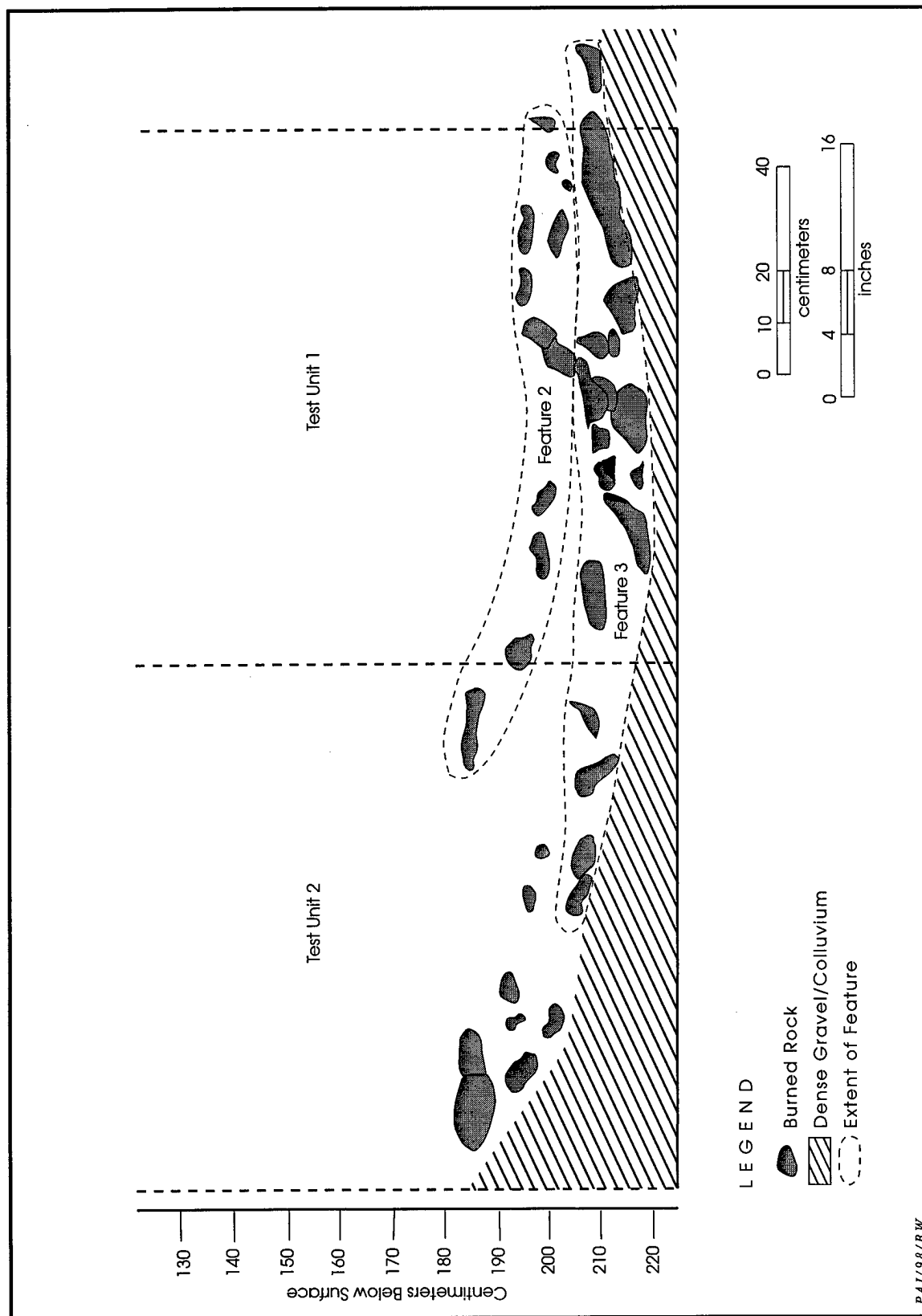


Figure 115. Profile of Features 2 and 3 in west wall of Backhoe Trench 3, 41CV1206.

# RESULTS OF TESTING AT OTHER OPEN SITES

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This chapter describes the results of archaeological testing at five sites located in the northern and eastern portions of Fort Hood (see Figure 2 and Table 3). These scattered sites are as much as 25 km apart, but the closest two are only 5 km apart. This site grouping is a catchall for sites that do not fit into any of the other site groups. A total of 13 backhoe trenches and 18 test units (161 levels) were excavated at these sites, and 6 analysis units were defined (Table 50).

## 41BL340

### Site Setting

Site 41BL340 is situated on the north side of Oak Branch near Belton Lake. During the uncontrolled range fire in the spring of 1996, the western portion of the site was bulldozed to provide a firebreak. This disturbance was generally limited to the upper 50 cm of deposits. A frequently traveled military trail parallels the northern site boundary, while an abandoned but highly eroded trail is present along the western boundary. With the exception of a few juniper and hardwood trees and blackberry bushes along the creek, the site is open and covered with

grasses. Site elevation is 250 m above mean sea level.

### Previous Work

On 15 April 1982, Thomas (Texas A&M University) initially recorded this site as a burned rock mound in an open field adjacent to Oak Branch. A "distinct rise or oval shaped mound with concentrated burned rock" was noted, but no dimensions were given for the feature or the site. Flakes were observed in an eroded trail crossing Oak Branch at the western site boundary. This eroded trail was the only recorded impact to the site. Construction of a log crib to divert vehicular traffic was recommended to protect the site.

Dureka and Pry (Texas A&M University) monitored the site on 24 November 1987. Although a recently constructed log crib was noted in the site area, the burned rock mound was not re-located. However, a burned rock lens containing mussel shells and a flake was observed at 1.5 m below the surface in a cutbank of Oak Branch, approximately 100 m east of the site. The investigators recommended that all of the cutbank exposures along Oak Branch and

**Table 50. Summary of analysis units defined at other sites**

Site Number	Subarea Tested	Analysis Unit	Analysis Unit Setting
41BL340	—	1	terrace (T <sub>1</sub> )
41CV755	A	1	toeslope
41CV957	B	1	terraces (T <sub>1a</sub> and T <sub>1b</sub> )
41CV1092	—	1	toeslope
41CV1152	A	1	terrace (T <sub>2</sub> )
	B	2	terrace (T <sub>1</sub> )

Cowhouse Creek be examined to ascertain the extent of buried cultural horizons.

On 20 October 1992, Abbott and Mehalchick (Mariah Associates) revisited and reevaluated the site. Although no cultural materials were observed, site dimensions were defined as 70 m east-west by 50 m north-south. The surface was covered by a drape of silty clay (up to 15 cm thick) deposited during the flood of December 1991. The cutbank of Oak Branch revealed a C-Ab-Bwkb-Cb profile, which suggested that the deposits had aggraded during the late Holocene and were equivalent to the upper and/or lower members of the West Range alluvium (Nordt 1992). Since the site had potential for buried cultural deposits, shovel testing was recommended.

On 3 December 1992, a crew excavated four shovel tests. Three burned rocks were recovered at 20–40 cm in two of the four shovel tests. Although few cultural materials were found and no clear evidence of a burned rock mound was observed, the site had the potential to contain intact deposits of unknown significance below the level of shovel testing. A testing effort of at least two backhoe trenches and 3–5 m<sup>2</sup> of manually excavated test units was recommended to determine the National Register eligibility of the site (Trierweiler, ed. 1994:A140).

### **Work Performed**

Formal testing of 41BL340 was completed by Prewitt and Associates on 14 May 1996 (Figure 116). Three backhoe trenches (Backhoe Trenches 1–3), two 1.0x0.5-m test units (Test Units 1 and 3), and one 1x1-m test unit (Test Unit 2) were excavated. A total of 2.85 m<sup>3</sup> was manually dug.

Backhoe Trench 1 (16.0x1.5x3.0 m) was oriented to 297° and excavated along the western site boundary. A few dispersed burned rocks were observed in the upper 40 cm of the profile. Backhoe Trench 2 (26.0x0.8x1.9 m) was oriented to 320° and placed at the central portion of the site, 20 m north of Oak Branch. Backhoe Trench 3 (15.0x1.5x2.5 m) was oriented to 250° and excavated along the eastern site boundary. Backhoe Trenches 2 and 3 did not reveal any cultural materials. The profiles of Backhoe Trenches 1 and 2 were described and soil geomorphology was assessed (see Appendix B).

Test Unit 1, excavated to 190 cm, was placed

along the northeast wall of Backhoe Trench 1. Test Unit 2, excavated to 110 cm, was oriented to magnetic north and placed between Backhoe Trenches 1 and 2. Test Unit 3 was excavated to 160 cm along the north wall of Backhoe Trench 3.

### **Site Extent and Depth**

The site covers an area of 115 m northeast-southwest by 45 m northwest-southeast. From west to east across the site, cultural artifacts were found at 0–90 and 120–130 cm in Test Unit 1, at 10–50 and 70–100 cm in Test Unit 2, and at 20–30, 40–50, 80–90, and 130–140 cm in Test Unit 3.

### **Sediments and Stratigraphy**

The profiles of Backhoe Trenches 1 and 2 consist of late Holocene-age sediment probably representing upper West Range alluvium. The 303-cm-thick profile of Backhoe Trench 1 (C-2Ab-2ABb-2Bwkb-2C-2C2-2C3 profile) consists of predominantly gravelly deposits over muddy alluvial deposits. The deposits are capped by a 3-cm-thick clay loam mantle related to the December 1991 flood and subsequent Belton Lake high-stand. A thick, well-developed cumulic soil (2Ab-2ABb-2Bwkb) was observed below the recent flood deposits.

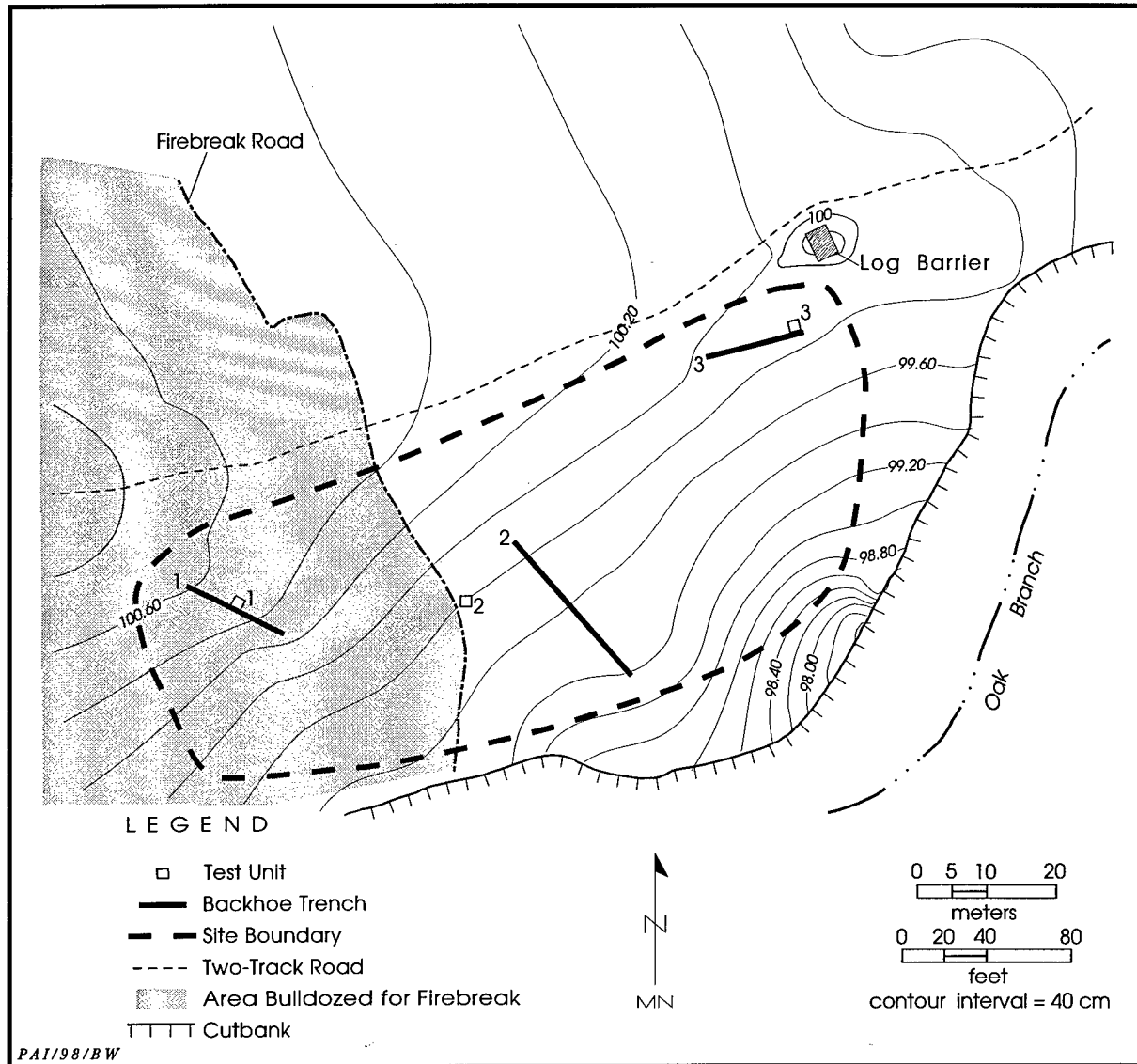
A similar 4-cm-thick mantle of recent flood deposits was observed in the profile of Backhoe Trench 2. Underlying this is a 122-cm-thick, well-developed cumulic soil (2Ab-2ABb-2Bwkb) formed in loamy and gravelly alluvial deposits.

### **Cultural Materials**

The few artifacts recovered from the site consist of 14 flakes, fewer than 30 burned rocks (3 kg), and 1 edge-modified flake. No diagnostic artifacts or datable organic remains were found.

### **Discussion**

In 1982, site 41BL340 was described as containing a burned rock mound. Subsequent site visits in 1987 and 1992, along with the results of formal test excavations, indicate that no burned rock features are present within the defined site area. The paucity of cultural materials and the lack of stratigraphically discrete components indicate an absence of significant



**Figure 116.** Site map, 41BL340.

archeological remains. Site 41BL340 is recommended as not eligible for listing on the National Register of Historic Places (NRHP).

#### 41CV755

##### Site Setting

Site 41CV755 is located along the southern valley margin of Owl Creek on the east side of an unnamed tributary. The tributary defines the southwestern site boundary, where the cutbank is nearly vertical and rises several meters above

the channel bed. All vegetation on the site was consumed by a large range fire in the spring of 1996. Now, only large charred tree trunks and sparse grasses remain. A frequently traveled two-track road parallels the northern site boundary. Site elevation is 230 m above mean sea level.

##### Previous Work

Wright and Strychalski (Texas A&M University) recorded the site on 13 June 1984 as a low-density lithic scatter on a fluvial lowland. Site dimensions were defined as 156 m

east-west by 40 m north-south. Only a few flakes and biface fragments were observed. The depth of the deposits was considered to be at least 10 cm. An estimated 30 percent of the site was impacted by sheet erosion and vehicular traffic.

Frederick and Quigg (Mariah Associates) revisited and reevaluated the site on 12 March 1992. Site dimensions were defined as 150 m east-west by 60 m north-south. The site was divided into Subareas A and B on the basis of differing geomorphic contexts. Subarea A was defined as a zone of preserved soil on a colluvial toeslope minimally disturbed by sheetwash and vehicular traffic. The soil profile consisted of an A-C horizon sequence with at least 50 cm of presumably Holocene deposits. Subarea B included a ridge and erosional slope of Walnut Clay limestone and marl and a highly disturbed Pleistocene-age alluvial surface. No further work was recommended for Subarea B.

On 26 March 1992, a crew excavated four

shovel tests in Subarea A. Three yielded sparse prehistoric cultural materials. Total recovery included three flakes from 0–10 cm and three burned rocks from 30–50 cm. Because Subarea A had the potential for intact subsurface cultural deposits of unknown significance, formal testing was recommended. A minimum testing effort of at least two backhoe trenches and two manually excavated test units was recommended to determine the NRHP eligibility of Subarea A (Trierweiler, ed. 1994:A1022–A1024).

### Work Performed

On 15 May 1996, Prewitt and Associates completed formal testing of Subarea A of site 41CV755 (Figure 117). Three backhoe trenches and two 1x1-m test units were excavated. A total of 2.2 m<sup>3</sup> was manually excavated.

Backhoe Trench 1 (20.0x0.8x2.0 m) was excavated in the western portion of the subarea, Backhoe Trench 3 (20.0x0.8x1.9 m) was exca-

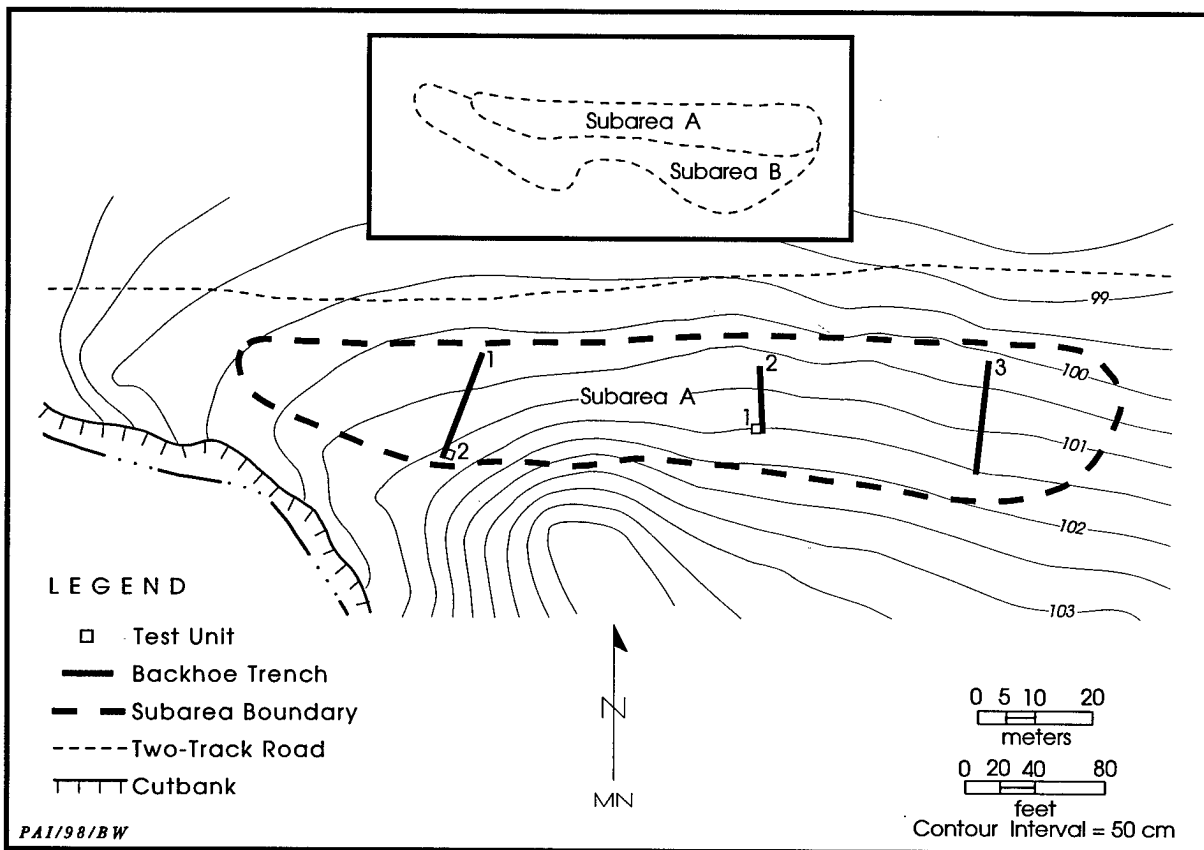


Figure 117. Map of Subarea A, 41CV755.

vated along the eastern margin, and Backhoe Trench 2 (12.0x1.5x2.5 m) was placed between these two. All three trenches were oriented generally north-south, perpendicular to the slope. No cultural materials were observed in any of the trench profiles. The profiles of Backhoe Trenches 1 and 2 were described and soil geomorphology was assessed (see Appendix B).

Test Unit 1 was placed along the west wall of Backhoe Trench 2 and Test Unit 2 was placed along the east wall of Backhoe Trench 1. Both test units were oriented relative to the long axis of their associated trench, and each was excavated to ancient sediments at 110 cm.

### Site Extent and Depth

Current investigations were limited to Subarea A, which comprises the northern half of 41CV755. Subarea A extends ca. 150 m east-west and 25 m north-south. Cultural artifacts were found to a depth of 100 cm in Test Unit 1 and 90 cm in Test Unit 2.

### Sediments and Stratigraphy

Subarea A encompasses a mantle of Holocene-age colluvium overlying late Pleistocene-age Jackson alluvium and the Lower Cretaceous Walnut Formation. The profile of Backhoe Trench 1 revealed a Holocene-age gravelly to very gravelly clay loam colluvium (0–94 cm) overlying the Jackson alluvium (94–194+ cm). An A-Bwk-2Bbk-2Ck soil profile is imprinted on these deposits. Backhoe Trench 2 revealed a profile (A-Bw-Ck-2R) consisting of a 122-cm-thick gravelly clay loam Holocene colluvium overlying the Lower Cretaceous Walnut Formation.

### Cultural Materials

Low frequencies of lithic

artifacts were recovered from most levels excavated in each test unit. Recovery from the test units included 11 flakes, 1 miscellaneous uniface, and 2 burned rocks from Test Unit 1 and 41 flakes, 6 burned rocks, 1 edge-modified flake, 1 miscellaneous biface, and 1 miscellaneous uniface from Test Unit 2 (Table 51). The only diagnostic artifact is an untypeable dart point from Test Unit 2 at 50–60 cm. No subsistence remains were discovered.

### Discussion

Small amounts of lithic debitage, tools, and burned rocks are the only cultural materials recovered during the present investigation. Within the excavation units, artifacts were found in the majority of levels, but they occur within a poorly sorted colluvial matrix. This evidence, along with the lack of appreciable sediment upslope in Subarea B, suggests that the deposits in Subarea A are redeposited. These colluvial deposits have little or no potential for containing

Table 51. Summary of cultural materials from 41CV755

Provenience	Dart Point	Miscellaneous Biface	Miscellaneous Unifaces	Edge-modified Uniface	Unmodified Debitage	Totals
<b>TEST UNIT 1</b>						
Level 1 (0–10 cm)	–	–	–	–	1	1
Level 2 (10–20 cm)	–	–	–	–	–	0
Level 3 (20–30 cm)	–	–	–	–	–	0
Level 4 (30–40 cm)	–	–	–	–	2	2
Level 5 (40–50 cm)	–	–	–	–	1	1
Level 6 (50–60 cm)	–	–	1	–	7	8
Subtotals	0	0	1	0	11	12
<b>TEST UNIT 2</b>						
Level 1 (0–10 cm)	–	1	–	–	1	2
Level 2 (10–20 cm)	–	–	1	–	6	7
Level 3 (20–30 cm)	–	–	–	–	9	9
Level 4 (30–40 cm)	–	–	–	–	16	16
Level 5 (40–50 cm)	–	–	–	–	4	4
Level 6 (50–60 cm)	1	–	–	1	3	5
Level 7 (60–70 cm)	–	–	–	–	–	0
Level 8 (70–80 cm)	–	–	–	–	1	1
Level 9 (80–90 cm)	–	–	–	–	1	1
Subtotals	1	1	1	1	41	45
<b>Totals</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>52</b>	<b>57</b>



intact features or isolable evidence of discrete occupations. It is recommended that Subarea A of 41CV755 be considered not eligible for listing in the NRHP.

#### 41CV957

##### Site Setting

The site is situated on a terrace immediately

south of Shoal Creek; it extends onto a large expanse of upland above the terrace (Figure 118). Unnamed tributaries border the eastern and western site margins. Numerous tank trails bisect the upland area, which is primarily open and covered with grasses. Isolated stands of juniper are present on the upland, but dense vegetation consisting of live oaks, junipers, shin oaks, and a thick understory parallels Shoal Creek. Site elevation is 270–280 m above mean sea level.

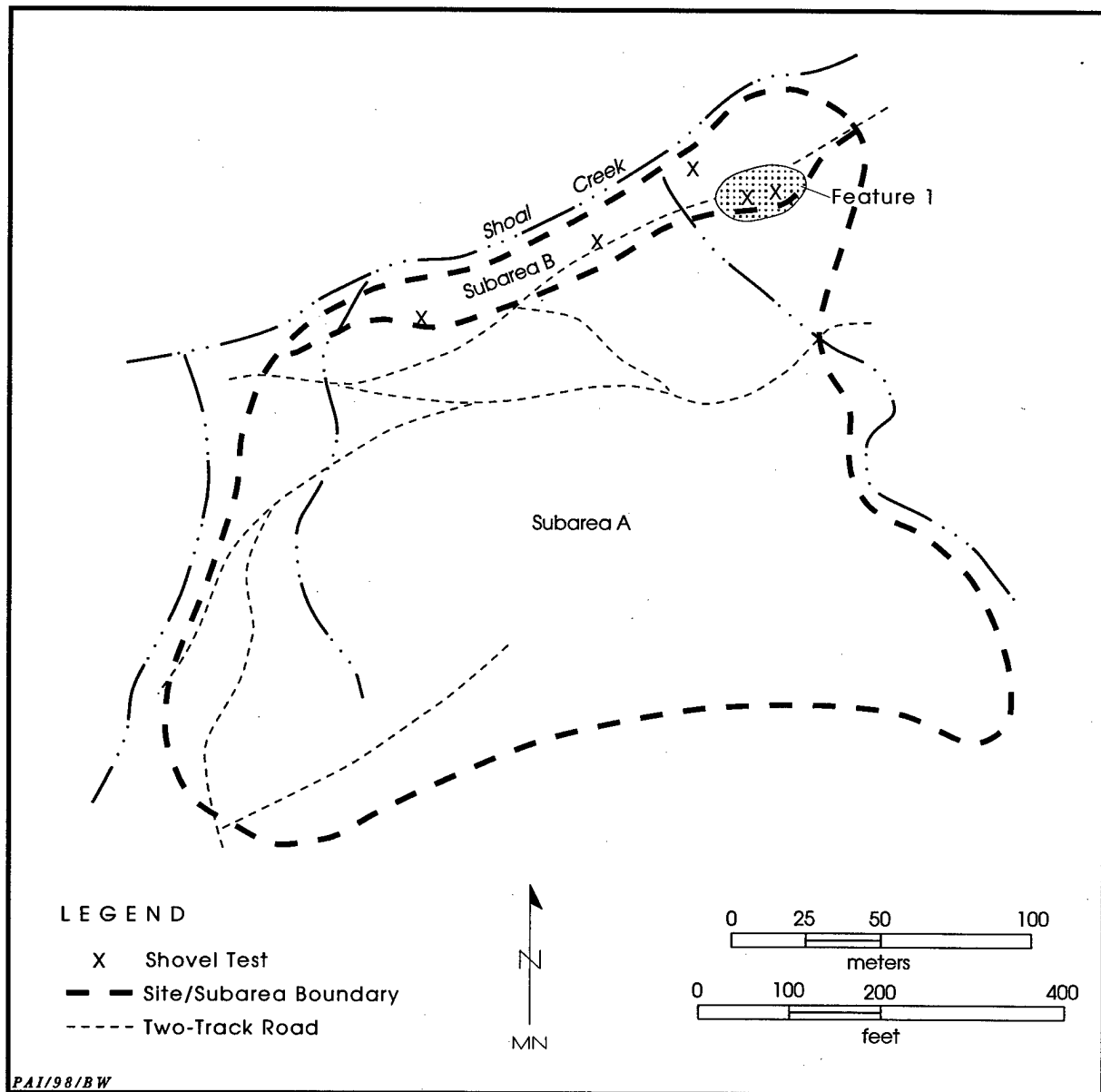


Figure 118. Site map, 41CV957 (modified from Trierweiler, ed. 1994:A1117).

### Previous Work

On 1 May 1985, Thomas (Texas A&M University) recorded the site as a scatter of lithic artifacts exposed in a road. No cultural materials were observed in vegetated areas, and much of the site was considered to be buried. No site dimensions were given, but an estimated 5 percent of the area was disturbed by the road.

Strychalski and J. Masson (Texas A&M University) rerecorded the site on 11 November 1986. They observed a lithic and burned rock scatter on an alluvial terrace and upland benches above Shoal Creek. Bifaces, flakes, burned rocks, scrapers, cores, hammerstones, retouched flakes, and two manos were noted across these landforms. Two untyped dart points and a Martindale point were collected. The site measured 360x240 m and was estimated to be 80 percent impacted by tracked vehicles, erosion, animals, and bivouac.

On 18 January 1993, Mehalchick and Abbott (Mariah Associates) revisited the site and documented a large open campsite with dimensions of 250x200 m based on exposed cultural materials. It encompassed a sloping, disturbed intermediate upland (Killeen) surface and a narrow strip of preserved Holocene deposits that included two distinct alluvial surfaces. Based on geomorphic context and archeological potential, the site was divided into Subareas A and B.

Subarea A was defined as the gently to moderately sloping upland surface. Much of the surface was bare regolith; elsewhere, it was mantled with a thin A horizon that usually represented slope wash reworking of the surface. A scatter of flakes, cores, bifaces, and burned rocks was observed. Tremendous impacts from tracked vehicles, bulldozing, and subsequent sheet and gully erosion were observed in this subarea. Due to the ubiquity of disturbance and negligible potential for intact cultural deposits, no further work was recommended.

Subarea B encompassed two narrow Holocene terraces situated next to Shoal Creek at the northern site margin. The majority of this subarea consisted of a lower terrace ( $T_{1b}$ ) 2–4 m above the modern stream and rarely more than 30 m wide. The underlying fill was up to 1.5 m thick and consisted of dark gray and dark grayish brown clay loam containing multiple thin gravel lenses. A weak soil with an A-C profile was evident in these deposits, along with strong

bedding indicative of frequent high energy deposition. These sediments appeared to be late Holocene in age, probably correlating to the West Range and/or Ford fill (Nordt 1992).

The  $T_{1a}$  surface, situated 0.75–1.25 m above the  $T_{1b}$  surface, was present only in the southeast corner of Subarea B. The fill was a dark grayish brown clay loam and supported a soil with an A-Bw-C profile. Much of the surface was mantled with a thin apron of colluvium and slope wash that showed weak soil development (i.e., A-C profile). Exposures were inadequate to determine if the terrace soil was buried by the colluvial apron, although this was suspected. Overall surface visibility was very poor due to grass cover and vegetation; however, a sparse scatter of debitage and burned rocks was noted. In addition, a 5x5-m burned rock concentration (Feature 1) with associated lithic artifacts was exposed in a tank trail along the southern margin of the  $T_{1a}$  surface. Although large quantities of burned rocks were present, some of the rocks may be naturally red due to iron staining.

Erosion, vegetation clearing, tank trails, and a foxhole (or possible pothole) had disturbed 50 percent of Subarea B. Based on the potential for intact buried cultural deposits, however, shovel testing was recommended.

On 19 February 1993, a crew excavated five shovel tests. No cultural materials were recovered from three shovel tests randomly placed on the lower terrace near Shoal Creek. Two shovel tests placed on Feature 1 produced dense amounts of cultural materials, particularly burned rocks, from the surface to a maximum depth of 50 cm. These results indicated that Subarea B had the potential to contain shallowly buried cultural deposits and possible deeply buried materials (below the level of testing). These cultural deposits were of unknown significance and could be considered potentially eligible for listing in the NRHP. The recommended testing effort was two backhoe trenches and 2–3 m<sup>2</sup> of manually excavated test units (Trierweiler, ed. 1994:A1116–A1119).

### Work Performed

On 22 May 1996, Prewitt and Associates completed formal testing of 41CV957, Subarea B (Figure 119). The previously recorded burned rock concentration (Feature 1) was re-located in the tank trail and appeared unchanged since its

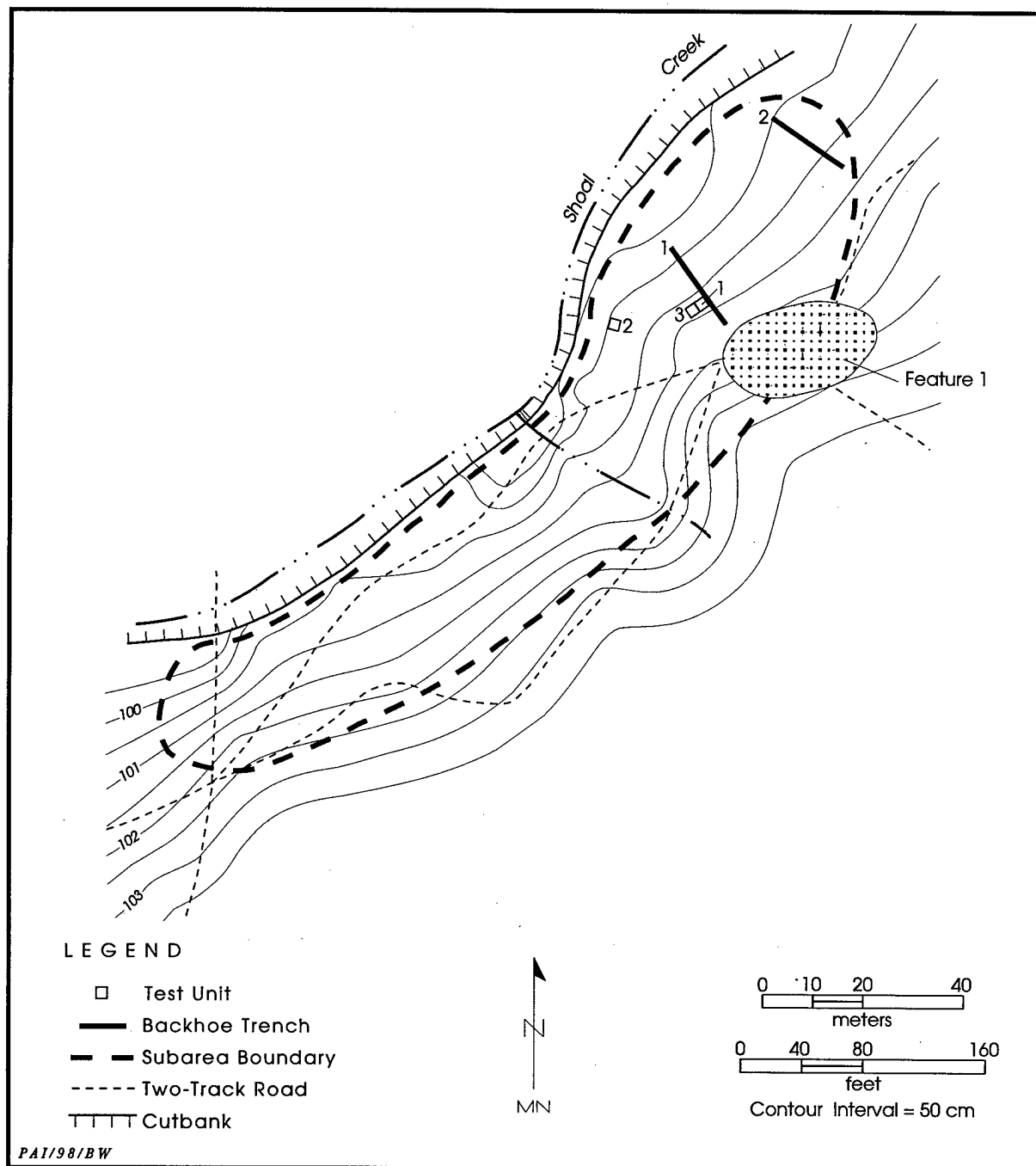


Figure 119. Map of Subarea B, 41CV957.

initial recording in 1993. Two backhoe trenches and three 1x1-m test units were excavated. A total of 3.1 m<sup>3</sup> was manually excavated.

Located north of the tank trail where Feature 1 was exposed, Backhoe Trench 1 bisected the higher and lower terraces (T<sub>1a</sub> and T<sub>1b</sub>,

respectively). The trench was oriented to 313° and had maximum dimensions of 18.0x0.8x1.7 m. Burned rocks and flakes were observed in the upper 80–100 cm of deposits across the entire length of the trench, with the cultural materials gradually dipping from south to north. The

densest amounts of cultural materials occurred at the upslope (southern) half of the trench. One Pedernales point was collected from a depth of 6 cm along the east wall near the trench's southern end, and one sandstone metate was observed in the backdirt. One alternately beveled Zephyr point was collected from the road just south of Backhoe Trench 1. Backhoe Trench 2 was excavated on the lower terrace ( $T_{1b}$ ) 35 m northeast of Backhoe Trench 1. The trench was oriented to  $300^\circ$  and measured  $16.0 \times 0.8 \times 1.2$  m, but did not reveal any cultural materials.

Test Unit 1 was excavated along the west wall of Backhoe Trench 1 above a lens of burned rocks exposed at 25 cm. Since numerous burned rocks were encountered at 12 cm and appeared to extend to the west, Test Unit 3 was placed contiguous to (west of) Test Unit 1 to further investigate the extent of the burned rocks. Both test units were arbitrarily excavated to 80 cm. Test Unit 2 was a freestanding unit located approximately 10 m north of the tank trail and 15 m northwest of Test Unit 3. Its excavation was arbitrarily terminated at 150 cm.

### Site Extent and Depth

The Subarea B terrace is wedged between Shoal Creek on the north and the edge of the upland surface to the south. The terrace continues an unknown distance east and west; however, the site boundaries in these two directions were previously delimited by separate unnamed drainages. Based on site mapping and testing results, the previously defined subarea remains unchanged and measures 140 m northeast-southwest by 40 m northwest-southeast, with its maximum dimension occurring at the eastern margin where the test excavations are located. The

vertical extent of cultural deposits is represented by Features 2 and 3 in Test Units 1 and 3 at 12–23 and 22–37 cm.

### Sediments and Stratigraphy

The profile of Backhoe Trench 1 reveals two alluvial fills, one inset to the other (Figure 120). The northern (channel proximal) end of the trench revealed deposits underlying the lower  $T_{1b}$  terrace surface. The underlying deposits consist of two alluvial fills. The overlying fill is a

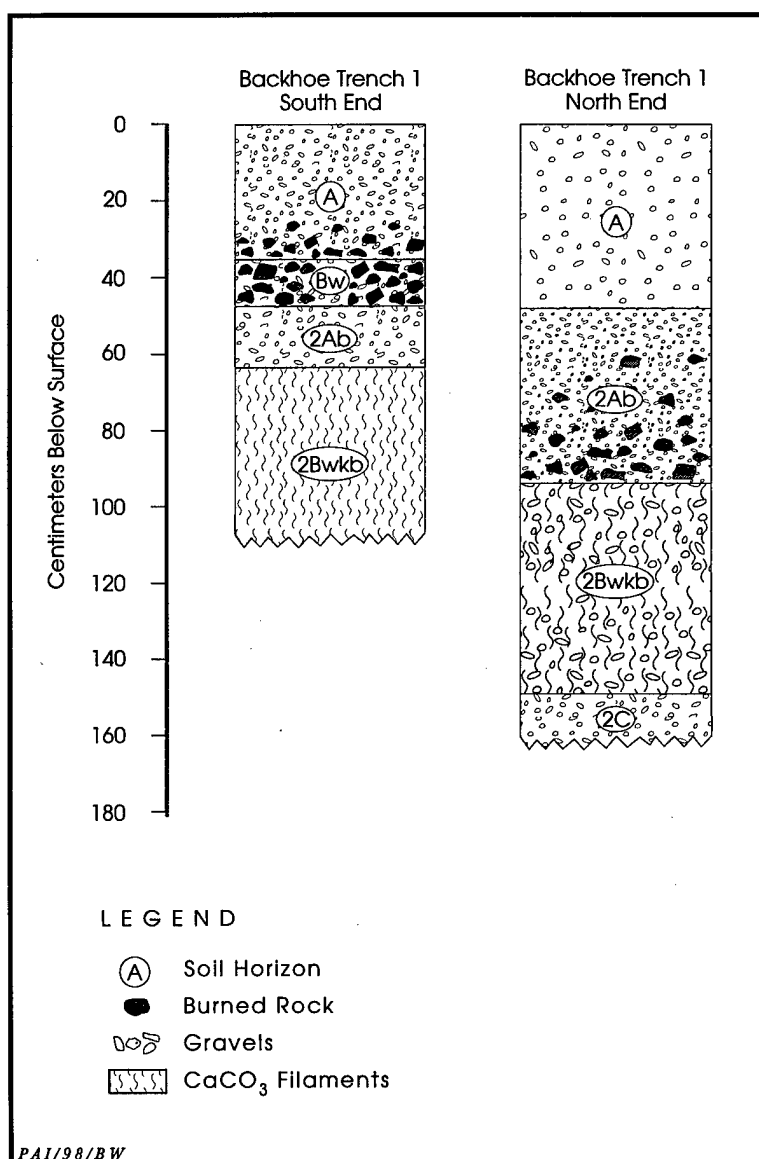


Figure 120. Profiles of Backhoe Trench 1, 41CV957.

48-cm-thick dark gray clay correlated to the Ford alluvium (Nordt 1992); it is imprinted with an A soil horizon. The 114+-cm-thick underlying fill consists of a gravelly clay loam and is correlated to the lower West Range alluvium (Nordt 1992); this alluvium is imprinted with a 2Ab-2Bwkb-2C soil.

The lower West Range alluvium was observed at the opposite end of the trench underlying the upper T<sub>1A</sub> terrace surface. The 110+-cm-thick profile is imprinted with two soils. The upper soil (A-Bw profile) is a 47-cm-thick, very dark gray to very dark grayish brown gravelly clay loam. The buried soil (2Ab-2Bwkb profile) is a 63+-cm-thick brown clay loam to gravelly clay.

### **Cultural Materials**

Testing of 41CV957 yielded 360 artifacts. In addition to the materials discussed below that were recovered from test units, three temporally and/or functionally diagnostic artifacts were found in or near Backhoe Trench 1. A Zephyr point was surface-collected south of the trench, a Pedernales point was found in situ at 6 cm in the trench, and a sandstone metate was observed (but not collected) in the trench's backdirt pile. Judging from the sediment adhering to it, the metate apparently came from the darker A horizon in the northern end of the trench (i.e., the upper 48 cm of deposits). It consists of two refit fragments that form a nearly complete metate (one small fragment is missing) that was made on a tabular slab of sandstone (probably nonlocal material). It measures 260x209 mm and is 21 mm thick. Both faces are ground with well-defined ovate depressions (i.e., grinding surfaces) measuring approximately 185x165 mm.

Test Units 1 and 3 are contiguous and are discussed together. From 0–20 cm, the two units produced 78 burned rocks (15.25 kg), 64 flakes, and 2 edge-modified flakes (Table 52). Recent intrusive items also were found from 0–20 cm in Test Unit 3. Feature 2, a burned rock concentration, was first exposed from 12–18 cm across most of both units (see Cultural Features). Directly beneath Feature 2, a hearth (Feature 3) was encountered at 22 cm in Test Unit 1 (see Cultural Features). The matrix surrounding the features at 20–40 cm contained moderate amounts of cultural materials: 121 burned rocks (17.5 kg); 54 flakes; 2 edge-modified flakes; 2 cores; 2 miscellaneous uniface; 1 miscellaneous

biface; and 1 cobble tool. Most of the cultural materials from 0–40 cm appear to be associated with Features 2 and 3. From 40–80 cm, Test Units 1 and 3 produced 16 burned rocks (4.75 kg), 35 flakes, an edge-modified flake, and 1 miscellaneous uniface.

Nine of 15 levels (60 percent) excavated in Test Unit 2 yielded cultural materials, including 16 flakes, 1 small burned rock, and 2 edge-modified flakes (see Table 52).

### **Cultural Features**

Feature 2, a burned rock concentration, was encountered from 12–23 cm in Test Units 1 and 3. When fully exposed in both units, the feature displayed an irregular outline with maximum excavated dimensions of 168 cm east-west by 100 cm north-south. Burned rocks visible in the north and south wall profiles of both test units indicate that the feature continues an unknown distance in these directions. No evidence of the feature was apparent in the west wall of Test Unit 3 or in the opposite (east) wall of Backhoe Trench 1. The feature gently slopes from east to west and is comprised of two layers of horizontally laid burned rocks ( $n = 225$ , 48.5 kg). The uppermost layer contained many small, friable pieces of fossiliferous limestone (25 percent), with the remainder consisting of fist-sized, angular, blocky, nonfossiliferous limestone.

The feature matrix produced 127 flakes and 1 edge-modified flake. Two processed flotation samples contained abundant microdebitage and some microfauna. Although no recent or historic materials were found in the feature fill, the presence of such items in the surrounding nonfeature matrix indicates that contextual integrity has been compromised by root intrusion and compression of the deposits by tracked vehicles.

From 22–37 cm, Feature 3 was confined to Test Unit 1 (Figure 121). It is a shallow, basin-shaped hearth with maximum excavated dimensions of 100 cm north-south by 95 cm east-west. Based on the exposure of burned rocks in the west wall of Backhoe Trench 1, the hearth's complete dimensions are estimated to be 130 cm north-south by 110 cm east-west. The feature consists of a single layer of fist-sized and larger (up to 26x20x5 cm) burned rocks ( $n = 75$ , 51 kg) exhibiting very little imbrication. All of the burned rocks are nonfossiliferous limestone, with a few cracked in situ. Most pieces are tabular or

Table 52. Summary of cultural materials from 41CV957

Provenience	Dart Points	Miscellaneous Biface	Miscellaneous Unifaces	Cobble Tool	Edge-Modified Flakes	Cores	Unmodified Debitage	Metate*	Totals
<b>BACKHOE TRENCH 1</b>									
6 cm	1	-	-	-	-	-	-	-	1
unknown depth	-	-	-	-	-	-	-	1	1
Subtotals	1	0	0	0	0	0	0	1	2
<b>GENERAL COLLECTION</b>									
surface	1	0	0	0	0	0	0	0	1
<b>TEST UNIT 1</b>									
Level 1 (0-10 cm)	-	-	-	-	-	-	8	-	8
Level 2 (10-20 cm)	-	-	-	-	-	-	31	-	31
Level 3 (20-30 cm)	-	-	-	-	-	-	3	-	3
Level 4 (30-40 cm)	-	1	1	1	1	1	31	-	36
Level 5 (40-50 cm)	-	-	1	-	-	-	12	-	13
Level 6 (50-60 cm)	-	-	-	-	-	-	-	-	0
Level 7 (60-70 cm)	-	-	-	-	-	-	-	-	0
Level 8 (70-80 cm)	-	-	-	-	-	-	-	-	0
Feature 3 (22-37 cm)	-	-	1	-	-	-	45	-	46
Subtotals	0	1	3	1	1	1	130	0	137
<b>TEST UNIT 2</b>									
Level 6 (50-60 cm)	-	-	-	-	-	-	1	-	1
Level 7 (60-70 cm)	-	-	-	-	-	-	1	-	1
Level 8 (70-80 cm)	-	-	-	-	-	-	2	-	2
Level 9 (80-90 cm)	-	-	-	-	-	-	1	-	1
Level 10 (90-100 cm)	-	-	-	-	-	-	-	-	0
Level 11 (100-110 cm)	-	-	-	-	-	-	1	-	1
Level 12 (110-120 cm)	-	-	-	-	1	-	3	-	4
Level 13 (120-130 cm)	-	-	-	-	-	-	3	-	3
Level 14 (130-140 cm)	-	-	-	-	1	-	-	-	1
Level 15 (140-150 cm)	-	-	-	-	-	-	4	-	4
Subtotals	0	0	0	0	2	0	16	0	18
<b>TEST UNIT 3</b>									
Level 1 (0-10 cm)**	-	-	-	-	-	-	5	-	5
Level 2 (10-20 cm)**	-	-	-	-	2	-	20	-	22
Level 3 (20-30 cm)	-	-	1	-	-	1	6	-	8
Level 4 (30-40 cm)	-	-	-	-	1	-	14	-	15
Level 5 (40-50 cm)	-	-	-	-	-	-	7	-	7
Level 6 (50-60 cm)	-	-	-	-	1	-	14	-	15
Level 7 (60-70 cm)	-	-	-	-	-	-	2	-	2
Level 8 (70-80 cm)	-	-	-	-	-	-	-	-	0
Subtotals	0	0	1	0	4	1	68	0	74
<b>TEST UNITS 1 AND 3</b>									
Feature 2 (12-23 cm)	0	0	0	0	1	0	127	0	128
Totals	2	1	4	1	8	2	41	1	360
* Not collected									
** Includes recent intrusive items									



**Figure 121.** View west-northwest of Feature 3 in Test Units 1 and 3, 41CV957.

angular, but three slabs were noted. A few roots in the feature fill caused minimal disturbance. The feature fill contained 45 flakes and 1 miscellaneous uniface. Charcoal collected at 32–36 cm yielded a radiocarbon age of  $3160 \pm 40$  B.P. (Beta-102108, see Appendix A). A flotation sample of feature sediment from 32–36 cm was submitted for macrobotanical analysis but produced no carbonized plant remains (see Appendix E).

#### Discussion

Utilization of the area during the early half

of the Late Archaic period is indicated by a calibrated charcoal radiocarbon date of 1440 (1420) 1400 B.C. (see Appendix A) on hearth Feature 3, which is overlain by Feature 2 (a burned rock concentration). Both features may be functionally and/or temporally related, with scattered burned rocks of Feature 2 representing debris discarded from the hearth. Although no diagnostic artifacts were associated with either feature, an *in situ* Pedernales point found at 6 cm along the trench wall in the vicinity of the test units approximates the dated component.

The test excavations demonstrate the presence of shallowly buried cultural deposits. The upper 20 cm of deposits (which contains the upper portion of Feature 2) appear disturbed, due primarily to compression by tracked vehicle maneuvering. Nonetheless, Feature 3 reveals that intact occupations occur below this level of disturbance (i.e., at 20–40 cm). The cultural assemblage, including burned rocks, chipped lithic artifacts, and a metate (not collected) associated with the buried A horizon exposed in Backhoe Trench 1 and Test Units 1 and 2, indicates that the site has substantial research potential. Although no macrobotanical remains were present in Feature 3, this may be due to limited sampling. It is likely that additional intact features and associated artifacts would be encountered in continued investigations. Subarea B, 41CV957 is therefore recommended as eligible for listing in the NRHP.

#### 41CV1092

#### Site Setting

Site 41CV1092 is located on the south side

of Browns Creek along the northern margin of Manning Mountain (Figure 122). The steep escarpment of Manning Mountain defines the majority of the site's boundaries; however, the site area includes portions of the steep colluvial slopes on the east, west, and north sides. The colluvial toeslope along the northern margin,

which abuts the southern edge of the Browns Creek alluvial terrace, is also contained in the site area. Vegetation is best described as an oak and juniper forest with grassy clearings. Numerous military trails traverse the site, particularly along the southwestern site margin. Site elevation is 330–340 m above mean sea level.

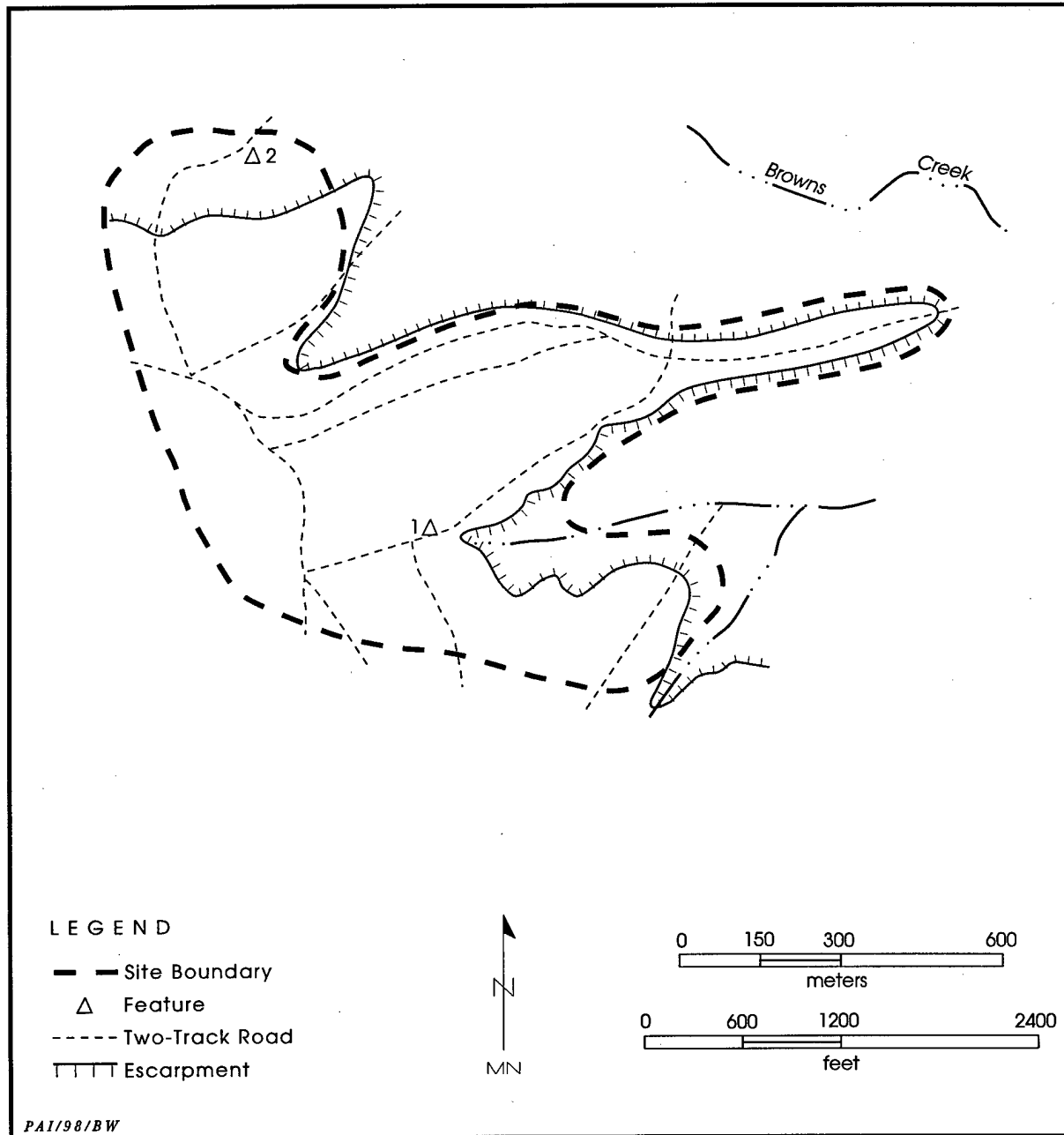


Figure 122. Site map, 41CV1092 (modified from Trierweiler, ed. 1994:A1215).



### **Previous Work**

This site was initially recorded by Masson (Texas A&M University) on 10 July 1985 as an extensive (1,200x1,000 m) multicomponent site containing burned rock mounds and concentrations. Twenty-five projectile points representing Paleoindian through Late Prehistoric periods were collected from the surface, and flakes, bifaces, burned rocks, and mussel shells were observed. Situated on the upland surface near the head of a small drainage, Feature 1 (Mound A) was described as a 10x8-m burned rock mound, 60–80 cm high. Feature 2 (Mound B) was described as a burned rock midden exposed along a section of a trail that traversed the toeslope at the north edge of the site. The site was estimated to be 55 percent disturbed by vehicular traffic and erosion.

The site was monitored (boundary check) by Moore and Strychalski (Texas A&M University) on 13 January 1986. The dimensions of the site were reaffirmed.

Dureka, Mesrobian, and Rodriguez (Texas A&M University) recorded a portion of this site on 5 May 1986 as a burned rock and lithic scatter. Although the site dimensions were reduced to 870x600 m, Dureka noted that the site extended farther to the west and north. One Montell and four untyped dart points were collected, and a low density of flakes and formal tools was observed. The site was estimated to be 90 percent disturbed by tank traffic, erosion, and tree cutting. Because of its large size, the site was classified as a lithic resource procurement area (LRPA).

Kleinbach and Abbott (Mariah Associates) revisited the site on 3 June 1993 to evaluate its geomorphic contexts and potential utility for yielding data to address research questions relating to lithic resource procurement. Site dimensions were increased to 1,700 m east-west by 1,400 m north-south. The upland surface was observed to be mantled with a truncated residual soil exhibiting a Bt-R profile that graded to A-R and R profiles on the upland margin and slopes. Although a low density of debitage was observed among the naturally occurring patchy pavement of nodular and tabular chert cobbles associated with the Bt horizon, the majority of artifacts were observed along the escarpment edge and adjacent to the two burned rock mounds (previously identified as Features 1 and 2). The eastern edge of Feature 1 had been clipped by a tank trail,

but otherwise it was observed to be undisturbed and intact. Chert and impact zones were identified, mapped, and characterized, and samples of raw material were collected.

On 28 June 1993, a crew performed an observational survey of portions of the chert zone and excavated three 50x50-cm test quads: one at the center of Feature 1, and two within the area defined as Feature 2. The test in Feature 1 was excavated to bedrock at 90 cm. Burned rocks were recovered from each level in amounts ranging from 8 to 34 kg per level. In addition to the burned rocks, 11 pieces of debitage and a Pedernales dart point were found. Each of the tests in Feature 2 encountered bedrock at 30 cm. One of the tests was sterile, and recovery from the other test consisted of 8 kg of burned rocks from 10–20 cm.

Based on the foregoing, the majority of the site was assessed as ineligible for listing in the NRHP, but Features 1 and 2 were thought to have some research potential. Feature 1 was determined to be an intact burned rock mound and was recommended as eligible for listing in the NRHP. Protection and avoidance were recommended. Feature 2, the partially exposed burned rock midden, contained cultural deposits of unknown significance. A minimum testing effort of 2–3 m<sup>2</sup> of manually excavated test pits was recommended to determine the NRHP eligibility of Feature 2 (Trierweiler, ed. 1994: A1218).

### **Work Performed**

In June 1996, Prewitt and Associates completed formal testing of Feature 2 at 41CV1092. Four 1x1-m test units (2.1 m<sup>2</sup>) were excavated. Test Units 1 and 3 were placed on the toeslope near areas of exposed burned rocks and were excavated to bedrock at 40 and 30 cm, respectively. Test Units 2 and 4 were placed at the base of the toeslope just above the T<sub>1</sub> terrace of Browns Creek and excavated to 70 cm (dense colluvium or well-developed carbonate nodules). All of the test units were oriented to magnetic north. The profiles of Test Units 1 and 2 were described and soil geomorphology was assessed (see Appendix B).

### **Site Extent and Depth**

Current investigations were limited to a small area (100x70 m) at the north edge of the site encompassing Feature 2 (Figure 123). Within

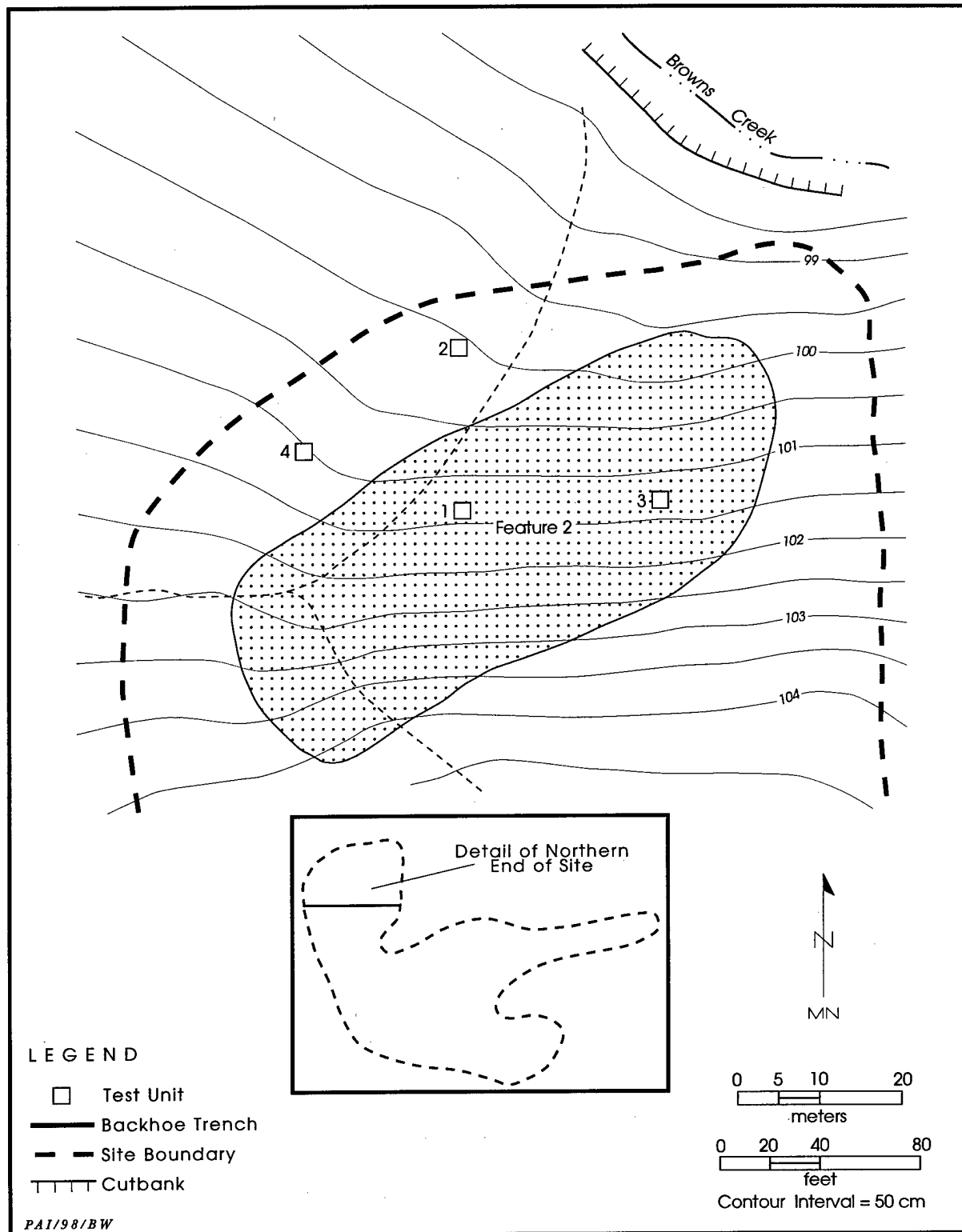


Figure 123. Map of northern end of 41CV1092, encompassing Feature 2.

Feature 2, cultural artifacts were found from 0–30 cm in Test Unit 1 and from 0–20 cm in Test Unit 3. At the base of the toeslope, cultural artifacts were found from 0–50 cm in Test Unit 2 and from 0–30 and 40–60 cm in Test Unit 4.

### **Sediments and Stratigraphy**

The stratigraphy in the vicinity of Feature 2 consists of a mantle of late Holocene gravelly dark clay loam colluvium. This deposit is imprinted with an A-Bw-2R soil profile in Test Unit 1. This soil is a 30-cm-thick black to very dark gray gravelly clay loam overlying weathered Walnut Formation limestone. The colluvial mantle observed in Test Unit 2 is imprinted with a 66+-cm-thick A-Bwk soil.

### **Cultural Materials**

Sparse cultural materials were recovered from the four test units for the area where Feature 2 was encountered. A total of 41 burned rocks (10 kg), 29 flakes, 1 miscellaneous uniface, and an untypeable dart point were recovered from nonfeature contexts.

### **Cultural Features**

Feature 2 is interpreted as a burned rock midden sporadically exposed along the toeslope due to military training activities (i.e., vehicular traffic). However, the extent of the disturbance is difficult to determine because the majority of the feature is densely vegetated with secondary brush growth subsequent to juniper cutting. It measures approximately 75 m north-east-southwest by 30 m northwest-southeast. Within Test Units 1 and 3, Feature 2 was encountered from 10–25 and 10–20 cm, respectively. Cultural artifacts recovered from the feature matrix include 88 flakes, 8 chert tools (including 1 untypeable dart point and 1 mano/hammerstone), 1 core, and 158 burned rocks (38 kg) from Test Unit 1 and 16 flakes, 1 miscellaneous uniface, and 90 burned rocks (35 kg) from Test Unit 3. The majority of the burned rocks observed on the surface and recovered from these test units were blocky angular fragments; the largest observed fragment measured 18x14x5 cm. No patterning to the burned rocks was observed. Notably, a substantial number of unburned pieces of limestone (i.e., colluvial

gravels) also were found. Minimal amounts of macrobotanical remains were discovered in three flotation samples from feature matrix (see Appendix E).

### **Discussion**

The current investigation focused only on Feature 2 and the area immediately downslope. This feature is shallowly buried within and restricted to the colluvial toeslope at the north edge of the site. Although lithic artifacts were recovered, the virtual lack of organic remains and the large amounts of colluvial gravels among the burned rocks suggests that the integrity of this feature has been compromised by extensive erosional disturbances. Whether the midden accumulated slowly on an active colluvial slope or was once intact but later disturbed by colluvial activity is unclear. Regardless, the northern end of the site has no viable research potential. It is recommended that Feature 2 at 41CV1092 be considered not eligible for listing in the NRHP.

### **41CV1152**

#### **Site Setting**

Site 41CV1152 is situated on terraces north and west of Henson Creek and east of an unnamed tributary. These drainages demarcate the western, southern, and southeastern site boundaries. The site is located within an area consumed by a large range fire that occurred in the spring of 1996. No ground cover is present, and the trees are now charred trunks. In addition, the southern half of the upper terrace was bulldozed to construct firebreaks. This disturbance is extensive, as evidenced by large trees that were uprooted and pushed into piles. Site elevation is 230 m above mean sea level.

#### **Previous Work**

On 4 December 1985, Moore and Strychalski (Texas A&M University) recorded the site. The area had been exposed by juniper clearing, and cultural materials were observed over an area measuring 180 m east-west by 80 m north-south. Debitage, bifaces, an untyped dart point base, burned rocks, mussel shells, and bones were scattered across the surface. A "chert field" noted on the gently sloping upland to the north was not

included as part of the site. An estimated 60 percent of the site was disturbed by tree clearing, burning, erosion, and roads.

On 28 October 1992, Abbott and Kleinbach (Mariah Associates) revisited the site. Based on the ubiquity of scattered cultural materials, primarily flakes and burned rocks, the original site size was expanded to 165 m east-west by 150 m north-south. The site was divided into two subareas based on geomorphic contexts.

Subarea A consisted of the higher terrace ( $T_2$ ), situated 7–8 m above Henson Creek and underlain by a relatively thick Pleistocene fill capped by a thin drape of probable late Holocene alluvium. The drape was up to 50 cm thick and exhibited an A-Bw profile. The underlying Pleistocene alluvium had a thick Bk horizon that contained a considerable quantity of dispersed matrix carbonate, probably representing diagenetic alteration by fluctuating groundwater. A high density of debitage, unfinished and finished bifaces, scattered burned rocks, and two burned rock concentrations (Features 1 and 2) were observed.

Located adjacent to an east-west road and near the eastern margin of the subarea, Feature 1 (4x2 m) consisted of 10–15 tabular burned rocks. Feature 2, consisting of numerous angular burned rocks exposed in a 12x3-m area was located near the northwest boundary of the subarea. Flakes, bifaces, and cores were associated with both features. In addition, a chert resource was noted upslope, immediately north of the site boundary. Although the surface of Subarea A was heavily impacted by cedar clearing, burning, scraping, tracked vehicles, and sheet erosion, it was noted that intact buried cultural deposits might exist beneath the level of disturbance. Therefore, shovel testing was recommended.

Subarea B included the lower terrace ( $T_1$ ) adjacent to the tributary. The matrix consisted of approximately 2 m of grayish brown clay loam underlain by clast-supported gravels. An A-Bwk-C profile developed at the surface suggested that the deposits were of late Holocene age. Moderate amounts of debitage were observed on the surface, but no stratified cultural materials were detected in the cutbank exposures. Since Subarea B had the potential to contain archaeological materials in buried context, shovel testing was recommended.

On 6 November 1992, a crew excavated a total of 24 shovel tests in Subarea A and 5 shovel

tests in Subarea B. All 5 tests in Subarea B were culturally sterile. In Subarea A, 4 shovel tests (16.7 percent) were negative; 11 (45.8 percent) contained sparse debitage at 0–20 cm; and the remainder ( $n = 9$ , 37.5 percent) yielded cultural materials to a maximum depth of 40 cm. Disturbance to portions of Subarea A was evidenced by mottled deposits from 0–30 cm and recent debris at 30–40 cm in some of the shovel tests.

Two portions of Subarea A appeared to have the potential for intact, buried cultural deposits. The first area, measuring 50x30 m, was in the vicinity of Shovel Tests 25 and 26 at the southern margin of the terrace. Shovel Test 25 contained a high density of debitage at 0–20 cm, while Shovel Test 26 yielded large amounts of burned rocks and debitage (designated Feature 3) at 0–28 cm. The deposits in both shovel tests appeared undisturbed. The second area with potential for buried deposits was near Shovel Tests 22 and 23; it measured ca. 30x15 m. These shovel tests, located on the upper terrace of Henson Creek, contained lithic artifacts in an undisturbed matrix to 40 cm.

Based on the shovel testing results, it was determined that portions of Subarea A contained intact cultural deposits in the upper 40 cm, and Subarea B had the potential for intact cultural materials in a stratified depositional context below the limits of shovel testing. To determine NRHP eligibility, the recommended testing effort included a minimum of 4 m<sup>2</sup> of manually excavated test units in Subarea A and one backhoe trench and 1–3 m<sup>2</sup> of manually excavated test units in Subarea B (Trierweiler, ed. 1994:A1289–A1294).

### Work Performed

On 4 October 1996, Prewitt and Associates completed formal testing of 41CV1152, Subareas A and B (Figure 124). Features 1 and 2 (recorded in 1992) could not be re-located with any degree of confidence due to the recent disturbances. The previously buried burned rock concentration (Feature 3) discovered during shovel testing was found to be completely disturbed, with burned rocks and debitage lying on exposed bedrock. Excavations in Subarea A consisted of three backhoe trenches (Backhoe Trenches 3–5) and four 1x1-m test units (Test Units 1–3 and 5). One backhoe trench (Backhoe Trench 2) and one 1x1-m test unit (Test Unit 4)

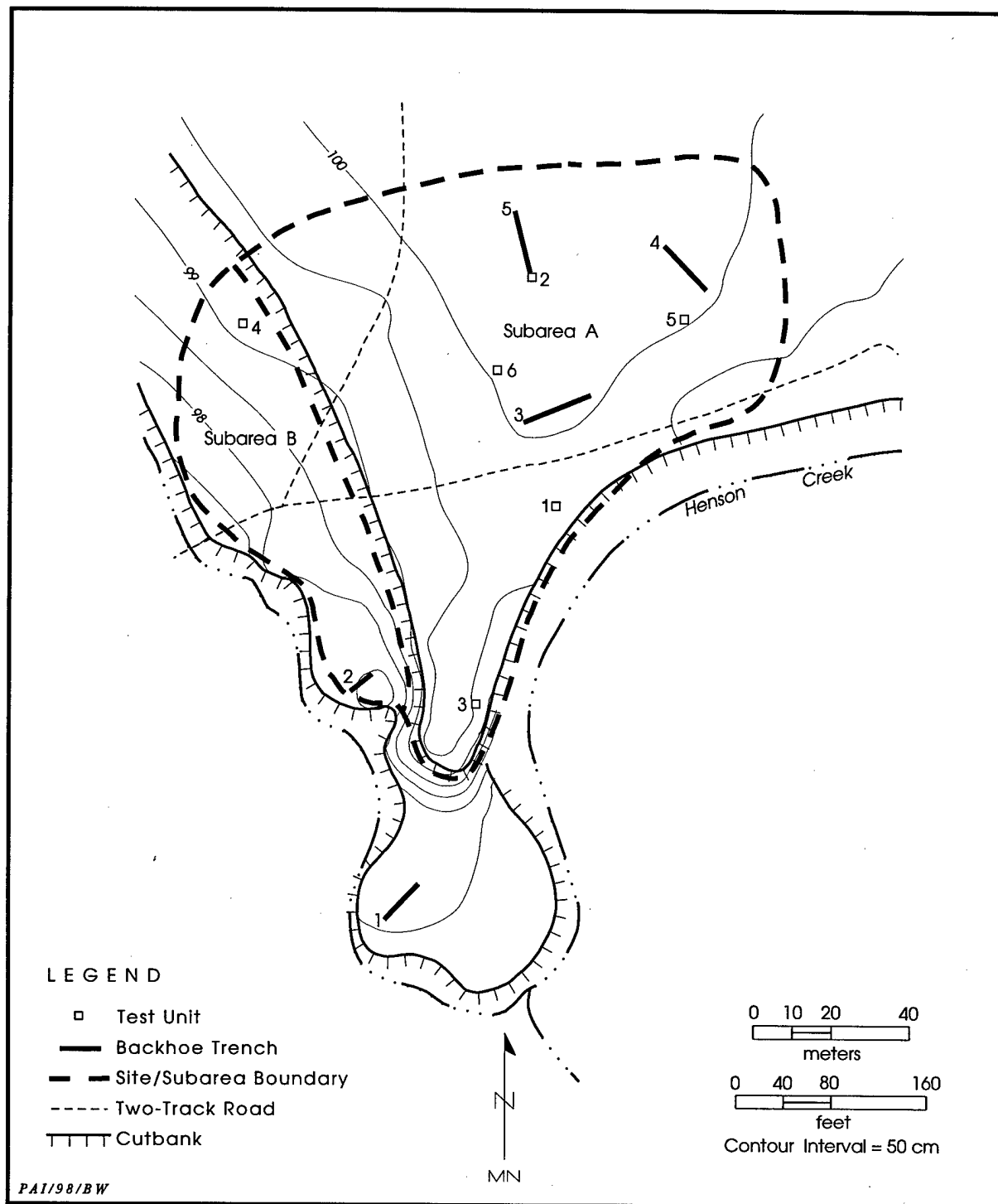


Figure 124. Site map, 41CV1152.

were excavated in Subarea B. Although not previously included within the site boundaries, a 50x50-m wedge of the lower terrace (T<sub>1</sub>) just

south of the site and adjacent to the tributary's confluence with Henson Creek also was formally tested with one trench (Backhoe Trench 1). A

total of 4.1 m<sup>3</sup> was manually excavated. The profiles of Backhoe Trenches 3 and 4 and Test Units 1, 2, and 4 were described and soil geomorphology was assessed (see Appendix B).

Excavated near the eastern margin of Subarea A, Backhoe Trenches 3–5 were oriented to 67°, 314°, and 342°, respectively. The trenches measured 18–19 m long, 0.80 m wide, and 1.5–2.5 m deep.

All of the isolated test units in Subarea A were oriented to magnetic north. Located 2.5 m south of a road and ca. 10 m north of a meander of Henson Creek, Test Unit 1 was placed in an area previously considered to have the potential for subsurface cultural deposits. The excavation was terminated when carbonates and gravels were encountered at 50 cm. Placed ca. 60 m north of Test Unit 1, excavation of Test Unit 2 was halted at 75 cm when abundant carbonate nodules were encountered. Test Unit 3 was excavated to bedrock at 20 cm just east of the tributary and beyond the southeastern edge of Feature 3 (the exposed burned rock concentration). Test Unit 5 was located 40 m southeast of Test Unit 2, in the east-central portion of Subarea A. The excavation was arbitrarily halted at 90 cm. Test Unit 6, placed 25 m south of Test Unit 2 and 50 m west of Test Unit 5, was excavated to abundant carbonate nodules at 80 cm.

In Subarea B, Backhoe Trench 1 was placed at the southern site margin just above the confluence of Henson Creek and its tributary. The trench was oriented to 45° and measured 12.0x0.8x1.5 m. Approximately 5 m east of the tributary, Backhoe Trench 2 was located 60 m northwest of Backhoe Trench 1. Oriented to 52°, the trench had dimensions of 9.0x0.8x1.4 m. No cultural materials were observed in either trench. Test Unit 4 (oriented to magnetic north) was situated ca. 25 m east of the tributary near the northwestern site boundary. Its excavation was arbitrarily stopped at 90 cm.

#### Site Extent and Depth

Based on the extent of surficial cultural materials and the testing results, site dimensions remain unchanged from those defined in 1992 (ca. 165x150 m). The test excavations yielded cultural materials from surface to a maximum depth of 90 cm, but no intact cultural deposits were encountered.

#### Sediments and Stratigraphy

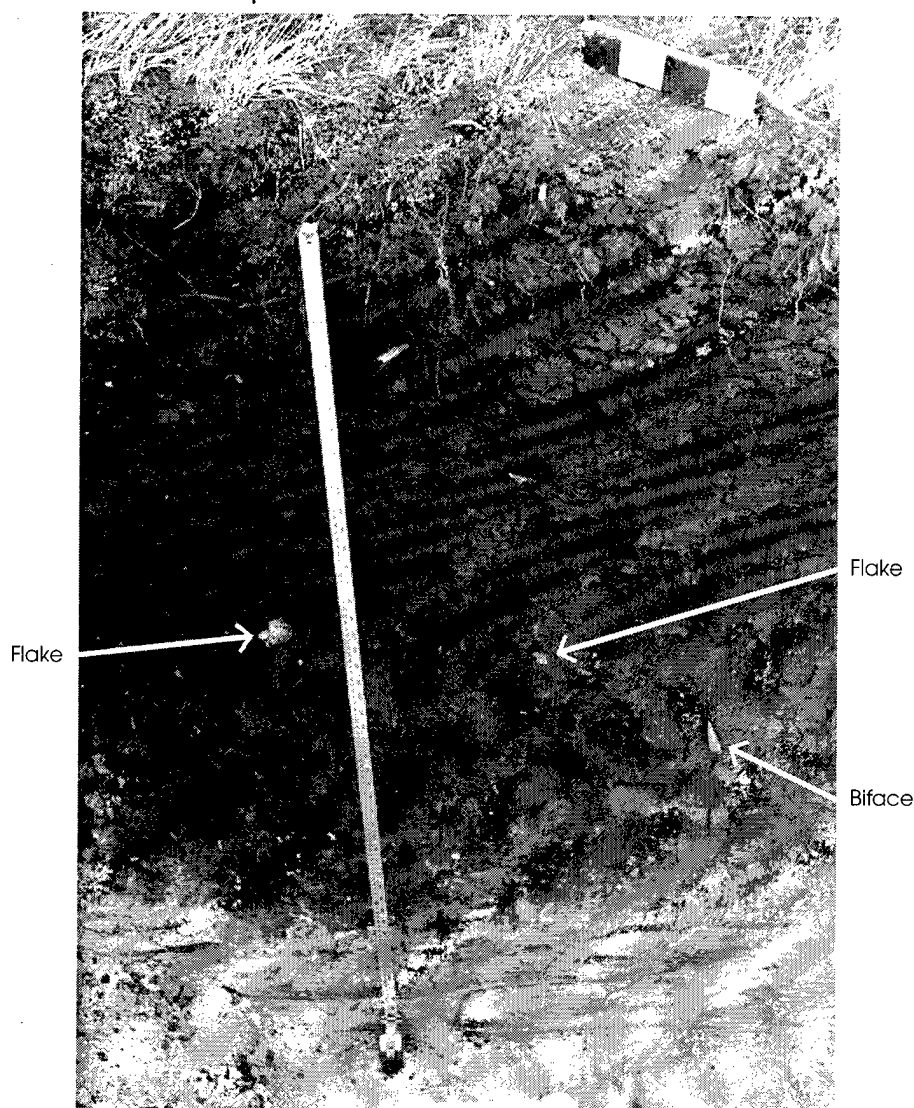
In Subarea A, the profiles of Backhoe Trenches 3 and 4 revealed clayey deposits overlying a clast-supported gravel (Figure 125). The clayey deposits consist of pedogenically altered late Pleistocene Jackson alluvium with probable minor contributions of Holocene alluvial and colluvial sediments. Similar soils (A-Bss-C-C2 and A-Bss-Ck profiles) were observed in both profiles. The soil mantle of Subarea A is a well-developed Vertisol, which masks the presence of any discrete late Pleistocene and Holocene stratigraphy. The A horizons are 33–53-cm-thick, very dark grayish brown to very dark gray clays. The underlying Bss horizons are 32–60-cm-thick, dark grayish brown to grayish brown clays characterized by slickensides on the ped faces. Although the sediments and soils are late Pleistocene in age, artifacts were recovered throughout the soil. Closer examination of the profiles of Backhoe Trenches 3–5 revealed several flakes and a biface in situ in the walls of Backhoe Trenches 4 and 5. All of these artifacts were observed below 30 cm and were oriented vertically, suggesting that the shrink/swell properties of the Vertisol fostered the downward movement of artifacts from the surface into the soil below. No cultural materials were noted in the Backhoe Trench 3 profile.

The profiles of Test Units 1 and 2 revealed a similar stratigraphy in Subarea A. The 50-cm-thick profile of Test Unit 1 consists of gravelly Jackson alluvium with probable minor contributions of Holocene alluvium. One soil imprint (A-Bkss-BC profile) was observed. The profile of Test Unit 2 consists of a mix of very dark gray and dark grayish brown clayey Jackson alluvium and Holocene alluvium and colluvium. The single soil profile (A-Bw-C) observed in this unit is similar to the soils observed in other excavations.

In Subarea B, the stratigraphy of Test Unit 4 consisted of loamy late Holocene alluvial sediments imprinted with two soils. The upper soil is 35 cm thick and consists of a dark gray A horizon and dark grayish brown Bw horizon. The buried soil (35–82+ cm) is a black to dark gray gravelly clay with a 2Ab-2Bwkb profile.

#### Definition of Analysis Units

Based on the presence of different geomorphic surfaces, two analysis units are defined. The



**Figure 125.** Stratigraphic profile of west wall of Backhoe Trench 4, 41CV1152. Note that the flakes and biface are oriented vertically.

higher (Pleistocene) terrace ( $T_2$ ) of Subarea A corresponds to Analysis Unit 1, whereas Analysis Unit 2 correlates to the lower (Holocene) terrace ( $T_1$ ) comprising Subarea B.

#### **Analysis Unit 1**

Analysis Unit 1 includes the  $T_2$  terrace of Henson Creek, which is primarily composed of Jackson alluvium with an overlying but indistinct veneer of Holocene alluvium and colluvium. Because of the extent of soil formation on this terrace, stratigraphic separation of the Holocene

sediments and the Jackson alluvium is not possible. Pedogenic processes have virtually melded the two units together into an indistinguishable mass. Although the Holocene sediments represent a minor contribution to the aggradation of this surface, it is impossible to determine the thickness of this drape due to pedogenic alteration.

#### **Cultural Materials Recovered**

Within the five test units excavated in Subarea A, 26 of 32 excavation levels (81.3 percent) yielded artifacts. Cultural materials consist of 140 flakes and 46 lithic tools (Table 53).

#### **Discussion**

It was assumed that all of the artifacts found in the late Pleistocene Jackson alluvium were out of context and had somehow worked their way down from the terrace surface. A close examination of the soil profiles in the backhoe trenches in Subarea A confirmed that this is the case. Approximately six vertically oriented lithic artifacts were observed in situ between 30 and 70 cm in the walls of Backhoe Trenches 4 and 5. None of the artifacts observed below ca. 30 cm were lying horizontal. Several of the vertical flakes were rather large, with the largest being a 4-cm-long flake observed at 50 cm in Backhoe Trench 4. A 5-cm-long biface found at 68 cm in Backhoe Trench 4 also was oriented vertically and was obviously situated in an old soil crack. This evidence indicates that the cultural materials had moved down-profile throughout the vertic soil mantle due to its shrink/swell properties.

Table 53. Summary of cultural materials from 41CV1152, Analysis Unit 1

Provenience	Gouge	Early/Middle-stage Bifaces	Miscellaneous Bifaces	Miscellaneous Unifaces	Graver/Burin	Core Tools	Multifunctional Tools	Edge-modified Flakes	Unmodified Debitage	Totals
<b>TEST UNIT 1</b>										
Level 1 (0–10 cm)	1	1	–	1	–	–	1	2	18	24
Level 2 (10–20 cm)	–	–	–	1	–	–	–	1	5	7
Level 3 (20–30 cm)	–	–	–	1	–	–	–	4	5	10
Level 4 (30–40 cm)	–	–	–	2	–	–	–	1	16	19
Level 5 (40–50 cm)	–	–	–	–	–	–	–	–	1	1
Subtotals	1	1	0	5	0	0	1	8	45	61
<b>TEST UNIT 2</b>										
Level 1 (0–10 cm)	–	–	–	1	–	–	–	1	1	3
Level 2 (10–20 cm)	–	–	–	–	–	–	–	–	2	2
Level 3 (20–30 cm)	–	–	–	–	–	–	–	2	4	6
Level 4 (30–40 cm)	–	–	–	1	–	–	–	–	2	3
Level 5 (40–50 cm)	–	–	1	–	–	–	–	4	8	13
Level 6 (50–60 cm)	–	–	–	–	–	–	–	–	3	3
Level 7 (60–70 cm)	–	–	–	–	–	–	–	–	2	2
Level 8 (70–75 cm)	–	–	–	–	–	–	–	–	–	0
Subtotals	0	0	1	2	0	0	0	7	22	32
<b>TEST UNIT 3</b>										
Level 1 (0–10 cm)	–	1	–	1	1	2	1	4	17	27
Level 2 (10–20 cm)	–	–	–	2	–	–	–	1	3	6
Subtotals	0	1	0	3	1	2	1	5	20	33
<b>TEST UNIT 5</b>										
Level 1 (0–10 cm)	–	–	–	–	–	–	–	1	2	3
Level 2 (10–20 cm)	–	–	–	1	–	–	–	2	10	13
Level 3 (20–30 cm)	–	–	–	–	–	–	–	–	1	1
Level 4 (30–40 cm)	–	–	–	–	–	–	–	–	4	4
Level 5 (40–50 cm)	–	–	–	–	–	–	–	–	5	5
Level 6 (50–60 cm)	–	–	–	–	–	–	–	1	2	3
Level 7 (60–70 cm)	–	1	1	–	–	–	–	–	10	12
Level 8 (70–80 cm)	–	–	–	–	–	–	–	–	10	10
Level 9 (80–90 cm)	–	–	–	–	–	–	–	–	3	3
Subtotals	0	1	1	1	0	0	0	4	47	54
<b>TEST UNIT 6</b>										
Level 1 (0–10 cm)	–	–	–	–	–	–	–	–	4	4
Level 2 (10–20 cm)	–	–	–	–	–	–	–	–	–	0
Level 3 (20–30 cm)	–	–	–	–	–	–	–	–	–	0
Level 4 (30–40 cm)	–	–	–	–	–	–	–	–	–	0
Level 5 (40–50 cm)	–	–	–	–	–	–	–	–	–	0
Level 6 (50–60 cm)	–	–	–	–	–	–	–	–	1	1
Level 7 (60–70 cm)	–	–	–	–	–	–	–	–	1	1
Level 8 (70–80 cm)	–	–	–	–	–	–	–	–	–	0
Subtotals	0	0	0	0	0	0	0	0	6	6
<b>Totals</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>11</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>24</b>	<b>140</b>	<b>186</b>



The T<sub>2</sub> surface was undoubtedly occupied/ utilized for thousands of years, and the cultural materials represent a palimpsest of inseparable archeological components. In addition, all cultural materials more deeply buried in the late Pleistocene sediments are obviously out of place. The contextual integrity of these cultural materials is questionable at best. Even the one area where a burned rock concentration (Feature 3) was once intact has been so severely disturbed by recent bulldozing that the feature is virtually destroyed. No cultural components with any degree of contextual integrity exist in Subarea A, and it is recommended that Analysis Unit 1 be considered not eligible for listing in

the NRHP.

### **Analysis Unit 2**

Analysis Unit 2 subsumes all of the Holocene-age alluvial deposits in Subarea B from the surface to a maximum depth of 150 cm. No cultural materials were noted in the backhoe trenches, and Test Unit 4 produced only 7 flakes, 1 miscellaneous uniface, and 4 burned rocks from 0-20 cm. No features were encountered. Due to the paucity of cultural materials, no discrete cultural deposits were identified. It is recommended that Analysis Unit 2 be considered not eligible for listing in the NRHP.

# ANALYSIS OF MATERIALS RECOVERED

*Karl Kleinbach and Douglas K. Boyd*

10

This chapter addresses all of the materials recovered from the 42 tested sites (Table 54). Cultural artifacts are classified as chipped stone artifacts ( $n = 14,177$ ), ground and battered stone artifacts ( $n = 28$ ), and modified shells ( $n = 6$ ). Other cultural materials are classified as burned rocks (total weight = 7,593 kg), mussel shells ( $n = 194$ ), snail shells (unquantified), and bones ( $n = 1,019$ ). The stone tools are further divided into individual tool groups according to the artifact typology summarized earlier (see Table 4). Each class of material is discussed separately below.

## CHIPPED STONE ARTIFACTS

The chipped stone artifact class is dominated by 13,460 pieces of unmodified debitage (94.9 percent of the 14,178 specimens), but also includes 691 chipped stone tools (4.9 percent) and 27 cores (0.2 percent). With the exception of two dart points made of nonlocal materials, all of these artifacts are made of fine-grained cherts available within the Fort Hood military reservation. The projectile points are assigned to type groups (Elton Prewitt, personal communication 1997) using published typological data as summarized in Table 55. Analysis attributes for selected artifacts are presented in Appendix G.

### Arrow Points

Eleven arrow points were recovered from eight sites; two are complete and nine are fragmentary (Table 56). Metric attributes (see Appendix G) show that the arrow points are generally thin (2.9–4.6 mm for all specimens except distal fragments) with narrow necks (5.4–10.9 mm) and short blades (15.4–29.9 mm). The

six typed specimens include one Alba, one Clifton, and four Scallorn points. The typed specimens and one untyped arrow point are described separately below. The remaining four arrow points are fragments that cannot be assigned to any typological category or descriptive group.

### *Alba*

This nearly complete point (Figure 126a) has a slightly expanding stem and gentle convex base. Its blade is relatively wide and the barb is flared.

### *Clifton*

This complete point (Figure 126b) has a contracting stem and a pointed base. The blade is wide and the barbs are short.

### *Scallorn*

Of the five Scallorn points, one is complete but extensively reworked and four are proximal fragments (Figure 126c–g). All have expanding stems. Three have gentle convex bases; the remaining point has a broken base and its morphology is unknown. The blades range from wide to narrow and the barbs range from short to moderate in length. One of the proximal fragments is nearly complete (see Figure 126g) and has serrated blade edges.

### *Untyped*

This proximal fragment (Figure 126h) has a slightly expanding stem and a straight base. The blade is wide and the barbs are short. While similar to a Scallorn point, this specimen does

Table 54. Summary of artifacts recovered

Site	Analysis Unit	Arrow Points	Dart Points	Other Stone Tools	Cores	Unmodified Debitage	Ground and Battered Stones	Modified Shells	Totals
41BL340	1	-	-	1	-	14	-	-	15
41CV578	1	-	1	11	-	67	-	-	79
41CV578	2	-	2	5	-	57	-	-	64
41CV578	3	-	5	6	-	194	-	1	206
41CV755	1	-	1	4	-	52	-	-	57
41CV947	1	-	1	7	-	140	-	-	148
41CV957	1	-	2	14	2	341	-	-	359
41CV984	1	-	2	12	-	401	-	-	415
41CV988	1	-	9	7	-	527	1	-	544
41CV1012	1	-	-	-	-	17	-	-	17
41CV1030	1	-	-	4	-	20	-	-	24
41CV1043	1	1	1	-	1	58	1	-	62
41CV1048	1	-	-	1	-	13	-	-	14
41CV1049	1	1	2	6	2	97	-	-	108
41CV1050	1	-	2	2	-	27	-	-	31
41CV1092	1	-	2	8	1	133	1	-	145
41CV1093	1	-	1	6	-	242	2	-	251
41CV1106	1	-	2	4	1	30	-	-	37
41CV1120	1	-	3	8	-	241	-	-	252
41CV1122	0	-	2	-	-	-	-	-	2
41CV1122	1	-	4	19	1	692	1	-	717
41CV1122	2	-	2	6	1	166	-	-	175
41CV1133	1	-	6	11	2	344	4	2	369
41CV1137	1	-	-	1	-	2	-	-	3
41CV1138	1	-	6	9	1	124	-	-	140
41CV1143	1	1	-	-	-	2	-	-	3
41CV1152	1	-	-	46	-	140	-	-	186
41CV1152	2	-	-	1	-	7	-	-	8
41CV1191	1	3	7	29	2	987	5	-	1,033
41CV1191	2	-	4	5	1	148	1	-	159
41CV1191	3	-	-	-	-	2	-	-	2
41CV1194	1	-	-	-	-	12	-	-	12
41CV1194	2	-	-	-	-	1	-	-	1
41CV1206	1	-	-	1	-	19	-	-	20
41CV1211	1	1	1	1	-	101	-	-	104
41CV1211	2	-	-	-	-	2	-	-	2
41CV1218	1	-	2	-	-	-	-	-	2
41CV1219	1	-	2	1	-	34	-	-	37
41CV1221	2	-	4	12	1	703	-	-	720
41CV1222	1	-	-	-	-	6	-	-	6
41CV1222	2	-	1	1	-	45	-	-	47
41CV1225	1	-	-	-	-	71	-	-	71
41CV1225	0	-	1	-	-	-	-	-	1
41CV1235	0	-	-	1	-	-	-	-	1
41CV1235	1	-	12	30	1	1,271	5	-	1,319
41CV1235	2	-	11	37	4	692	2	-	746
41CV1250	1	2	-	16	-	228	1	3	250
41CV1250	2	-	-	9	1	41	-	-	51
41CV1258	1	-	-	-	-	9	-	-	9
41CV1269	0	-	14	1	-	-	-	-	15

Table 54, continued

Site	Analysis Unit	Arrow Points	Dart Points	Other Stone Tools	Cores	Unmodified Debitage	Ground and Battered Stones	Modified Shells	Totals
41CV1269	1	-	-	9	-	81	-	-	90
41CV1269	2	-	4	31	1	881	2	-	919
41CV1269	3	2	8	39	1	1,116	1	-	1,167
41CV1275	1	-	-	3	-	15	-	-	18
41CV1275	2	-	-	-	-	2	-	-	2
41CV1275	3	-	4	3	1	59	-	-	67
41CV1275	4	-	11	70	2	2,219	-	-	2,302
41CV1282	1	-	-	-	-	3	-	-	3
41CV1283	1	-	1	5	-	124	-	-	130
41CV1286	1	1	1	16	-	370	-	-	388
41CV1286	2	-	-	9	-	41	-	-	50
41CV1287	1	-	2	3	-	19	1	-	25
41CV1308	1	-	-	2	-	10	-	-	12
Totals		11	146	533	27	13,460	28	6	14,212

not conform closely enough to be assigned to this type. Its stem is nearly rectangular and the workmanship is generally poor. In addition, this point was chipped primarily on one face, while the opposite face is dominated by an unretouched flake scar. This unifacial working is reminiscent of the flaking technology on Perdiz points.

#### *Untypeable Fragments*

The four untypeable fragments are two distal, one medial, and a barb. These specimens are too fragmentary to be classified by type.

#### **Dart Points**

Of the 146 dart points recovered, 31 are complete (21.2 percent), 22 (15.1 percent) are nearly complete, and 93 (63.7 percent) are fragmentary. The 93 point fragments are classified as proximal ( $n = 58$ , 62.4 percent), distal ( $n = 17$ , 18.3 percent), barb ( $n = 10$ , 10.8 percent), medial ( $n = 7$ , 7.5 percent), and edge ( $n = 1$ , 1.1 percent). Dart points are much larger than arrow points, but the primary distinction is that the dart point neck widths (representing the approximate diameter of the shafts to which they were attached) are all greater than 10 mm (see Appendix G). The 107 dart points (73.3 percent)

with measurable neck widths range from 11.1 to 28.4 mm. Lengths of complete specimens ( $n = 31$ ) range from 35.7–84.2 mm, while blade widths range from 16.0–41.3 mm ( $n = 84$ ).

Ninety specimens (22 complete and 68 fragments) are assigned to named types: 27 Pedernales (33 percent); 11 Darl (12.2 percent); 10 Castroville (11.1 percent); 8 Ensor (8.9 percent); 5 Travis (5.6 percent); 4 each of Edgewood and Marshall (4.4 percent); 3 Dawson (3.3 percent); 2 each of Bulverde, Godley, Gower, Hoxie, Montell, and Zephyr (2.2 percent); and single specimens of Axtell, Baird, Ellis, Golondrina, Marcos, and Victoria (1.1 percent). Of the remaining 56 specimens, 11 (19.6 percent) are described as Provisional Type 1, 2 (3.6 percent) are described as Untyped Group 1, 7 (3 complete and 4 proximal fragments; 12.5 percent) are classified as untyped because they lack diagnostic features that conform to defined types, and 36 (64.3 percent) are classified as untypeable because they are too fragmentary to be classified by type. The Baird and one of the Pedernales points are made of chert that may be from the Waco area (Elton Prewitt, personal communication 1997); all other dart points were made from local cherts.

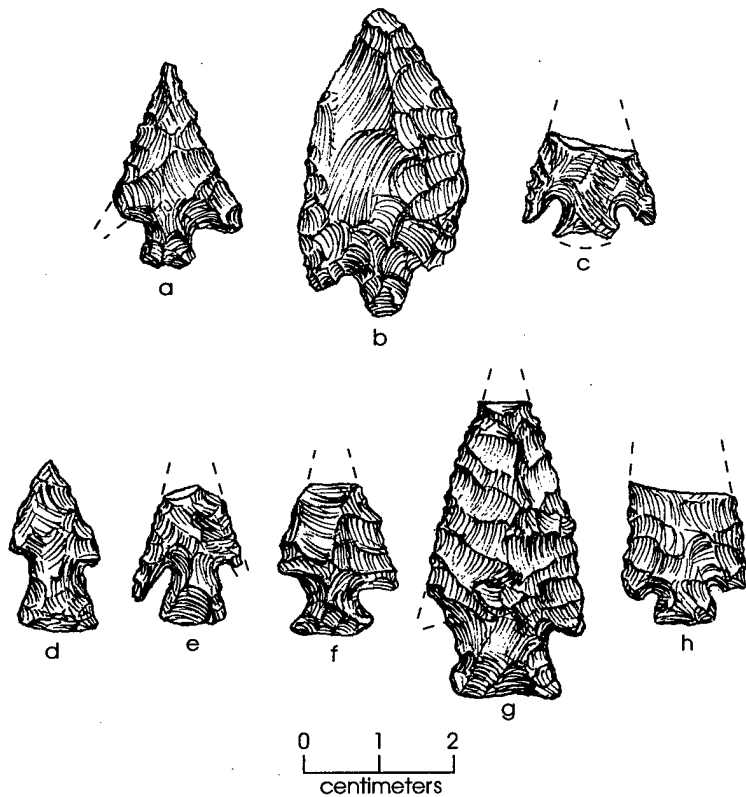
The relative ages of the typed dart points may be inferred from published typological descriptions (see Table 55) and assigned to

**Table 55. Primary references used in typological identification of projectile points**

Type	Reference
<b>ARROW POINTS</b>	
Alba	Bell 1958; Davis 1991; Krieger 1946; Suhm and Jelks 1962; Turner and Hester 1993
Clifton	Bell 1960; Davis 1991; Kelley 1947; Krieger 1946; Suhm and Jelks 1962; Turner and Hester 1993
Scallorn	Davis 1991; Kelley 1947; Krieger 1946; Suhm and Jelks 1962; Turner and Hester 1993
<b>DART POINTS</b>	
Axtell	Bryan 1936; Prewitt 1974; Turner and Hester 1993
Baird	Kelley 1947; Sorrow 1969
Bulverde	Bell 1960; Davis 1991; Kelley 1947; Suhm and Jelks 1962; Turner and Hester 1993
Castroville	Davis 1991; Kelley 1947; Suhm and Jelks 1962; Turner and Hester 1993
Darl	Bell 1960; Davis 1991; Miller and Jelks 1952; Suhm and Jelks 1962; Turner and Hester 1993
Dawson	Davis 1991; Duffield 1963; Prewitt 1974; Turner and Hester 1993
Edgewood	Bell 1958; Davis 1991; Suhm and Jelks 1962; Turner and Hester 1993
Ellis	Bell 1960; Davis 1991; Newell and Krieger 1949; Suhm and Jelks 1962; Turner and Hester 1993
Ensor	Bell 1960; Davis 1991; Miller and Jelks 1952; Suhm and Jelks 1962; Turner and Hester 1993
Godley	Davis 1991; Jelks 1962; Perino 1968; Turner and Hester 1993
Golondrina	Davis 1991; Johnson 1964; Perino 1971; Turner and Hester 1993
Gower	Davis 1991; Shafer 1963; Turner and Hester 1993
Hoxie	Davis 1991; Prewitt 1976; Turner and Hester 1993
Marcos	Bell 1958; Davis 1991; Suhm and Jelks 1962; Turner and Hester 1993
Marshall	Bell 1958; Davis 1991; Suhm and Jelks 1962; Turner and Hester 1993
Montell	Bell 1958; Davis 1991; Kelley 1947; Suhm and Jelks 1962; Turner and Hester 1993
Pedernales	Bell 1958; Davis 1991; Kelley 1947; Suhm and Jelks 1962; Turner and Hester 1993
Travis	Bell 1958; Davis 1991; Suhm and Jelks 1962; Turner and Hester 1993
Victoria	Davis 1991; Kelley 1983
Zephyr	Davis 1991; Prewitt 1976

**Table 56. Summary of arrow points by site and analysis unit**

Site	Analysis Unit	Alba	Clifton	Scallorn	Untyped	Untypeable	Totals
41CV1043	1	—	—	—	—	1	1
41CV1049	1	—	—	1	—	—	1
41CV1143	1	—	—	—	1	—	1
41CV1191	1	—	—	2	—	1	3
41CV1211	1	—	—	1	—	—	1
41CV1250	1	—	1	1	—	—	2
41CV1269	3	1	—	—	—	1	2
41CV1286	1	—	—	—	—	1	1
Totals		1	1	5	1	4	12



**Figure 126.** Arrow points. (a) Alba, 41CV1269; (b) Clifton, 41CV1250; (c) Scallorn, 41CV1191; (d) Scallorn, 41CV1049; (e) Scallorn, 41CV1250; (f) Scallorn, 41CV1211; (g) Scallorn, 41CV1191; (h) untyped, 41CV1143.

temporal periods corresponding to Collins's (1995: Table 2) refined central Texas chronology (see Figure 3). Of the 103 specimens assigned to named types or distinctive morphological groups, 28 (27.2 percent) are affiliated with the late Paleoindian, Early Archaic, or Middle Archaic periods (Table 57). The majority of specimens ( $n = 75$ , 72.8 percent) represent Late Archaic styles (Table 58). The 56 untyped and untypeable dart points cannot be assigned to any specific subperiod within the Archaic (Table 59).

#### *Axtell*

The proximal fragment of this point has an expanding stem and a strongly convex, rounded base with ground edges (Figure 127a). The blade is wide with abrupt shoulders.

**Table 57.** Summary of late Paleoindian, Early Archaic, and Middle Archaic dart points by site and analysis unit

Site	Analysis Unit	Axtell	Baird	Dawson	Golondrina	Gower	Hoxie	Provisional Type	Travis	Untyped Group 1	Totals
41CV0578, Subarea A	3	—	1	—	—	—	—	—	—	—	1
41CV1133	1	—	—	—	—	—	—	—	—	1	1
41CV1191	2	—	—	1	—	—	—	1	—	—	2
41CV1219, Subarea B	1	—	—	—	—	1	—	—	—	—	1
41CV1221, Subarea B	2	—	—	—	—	—	—	1	—	—	1
41CV1235	1	—	—	—	—	1	—	1	—	—	2
41CV1235	2	—	—	2	—	—	—	6	2	—	10
41CV1269, Subarea A	2	—	—	—	—	—	—	1	1	—	2
41CV1275, Subarea C	3	1	—	—	1	—	2	—	—	—	4
41CV1275, Subarea C	4	—	—	—	—	—	—	—	2	1	3
41CV1286, Subarea B	1	—	—	—	—	—	—	1	—	—	1
<b>Totals</b>	—	1	1	3	1	2	2	11	5	2	28

Table 58. Summary of Late Archaic dart points by site and analysis unit

Site	Analysis Unit	Bulverde	Castroville	Darl	Edgewood	Ellis	Ensor	Godley	Marcos	Marshall	Montell	Pedernales	Victoria	Zephyr	Totals
41CV578	2	-	-	1	-	-	-	-	-	-	-	-	-	-	1
41CV578	3	-	-	2	-	-	-	-	-	-	-	1	-	-	3
41CV957	1	-	-	-	-	-	-	-	-	-	-	1	-	1	2
41CV984	1	-	-	-	-	1	-	-	-	-	-	-	-	-	1
41CV988	1	-	-	3	1	-	1	-	-	-	-	-	-	-	5
41CV1043	1	-	-	-	-	-	1	-	-	-	-	-	-	-	1
41CV1049	1	-	-	1	-	-	-	-	-	-	-	1	-	-	2
41CV1050	1	-	-	1	-	-	-	1	-	-	-	-	-	-	2
41CV1106	1	-	-	-	-	-	1	-	-	-	-	1	-	-	2
41CV1120	1	-	1	-	-	-	-	-	-	-	-	2	-	-	3
41CV1122	0	-	-	-	-	-	-	-	-	-	-	2	-	-	2
41CV1122	1	-	1	-	-	-	-	-	-	-	-	3	-	-	4
41CV1122	2	-	-	-	-	-	-	-	-	-	-	1	-	-	1
41CV1133	1	-	-	-	-	-	-	-	-	-	-	2	-	-	3
41CV1138	1	1	1	-	1	-	2	-	-	-	-	-	-	-	4
41CV1191	1	-	-	3	-	-	1	-	-	-	-	-	-	-	4
41CV1191	2	-	-	-	-	-	-	-	-	-	-	2	-	-	4
41CV1218	1	-	-	-	-	-	-	-	-	-	-	-	1	1	2
41CV1221	2	-	1	-	-	-	-	-	-	-	-	-	-	-	1
41CV1225	0	-	-	-	-	-	-	-	-	-	-	1	-	-	1
41CV1235	1	-	1	-	-	-	-	-	-	-	1	3	-	-	5
41CV1235	2	-	-	-	-	-	-	-	-	-	-	1	-	-	1
41CV1269	0	-	4	-	-	-	1	-	-	4	1	3	-	-	13
41CV1269	2	-	-	-	-	-	-	-	-	-	-	2	-	-	2
41CV1269	3	-	1	-	2	-	-	-	1	-	-	-	-	-	4
41CV1275	4	1	-	-	-	-	1	1	-	-	-	-	-	-	3
41CV1287	1	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Totals		2	10	11	4	1	8	2	1	4	2	27	1	2	75

**Table 59. Summary of untyped and untypeable dart points by site and analysis unit**

Site	Analysis Unit	Untypeable	Untyped	Totals
41CV0578	1	1	-	1
41CV0578	2	1	-	1
41CV0578	3	-	1	1
41CV0775	1	1	-	1
41CV0947	1	1	-	1
41CV0984	1	1	-	1
41CV0988	1	4	-	4
41CV1092	1	2	-	2
41CV1093	1	1	-	1
41CV1122	2	2	-	2
41CV1133	1	-	2	2
41CV1138	1	2	-	2
41CV1191	1	3	-	3
41CV1211	1	1	-	1
41CV1219	1	-	1	1
41CV1221	2	2	-	2
41CV1235	1	4	1	5
41CV1269	0	1	-	1
41CV1269	3	4	-	4
41CV1275	4	4	1	5
41CV1283	1	-	1	1
41CV1287	1	1	-	1
Totals		36	7	43

***Baird***

This complete, unstemmed, triangular point has a shallow concave base and wide serrated blade (Figure 127b). This specimen was manufactured of chert that is pinkish white in color with white, reddish brown, and black speckling. Its color appears to be the result of heat treating, but the material is definitely nonlocal.

***Bulverde***

Of the two Bulverde points, one is complete and one is nearly complete (Figure 127c, d). These points are very similar in morphology with each having a slightly contracting stem, shallow concave base, wide blade, and short shoulders.

***Castroville***

All 10 Castroville dart points are proximal

fragments with expanding stems (Figure 127e-g). Although all have wide stems (19.7-26.3 mm), the bases vary from straight to gently convex. All of the blades also are wide (29.9-41.1 mm), but the length of the barbs ranges considerably (from short to very long).

***Darl***

Of the 11 Darl points, 4 are complete, 3 are nearly complete, and 4 are proximal fragments (Figure 127h-j). Stem morphology ranges from slightly expanding to slightly contracting, with shallow to fairly deep concave bases. These points have narrow blades (16.0-20.6 mm) and weak to abrupt shoulders; however, at least seven of these have been reworked to some extent.

***Dawson***

Three complete Dawson points were recovered (Figure 128a-c). Although each has a slender blade and abrupt shoulders, the stems range from slightly expanding to contracting. The straight base on one point is a striking platform, while the other two specimens have gently convex bases.

***Edgewood***

Four Edgewood points were recovered; all are proximal fragments. They are characterized by expanding stems, shallow concave bases, and short barbs (Figure 128d).

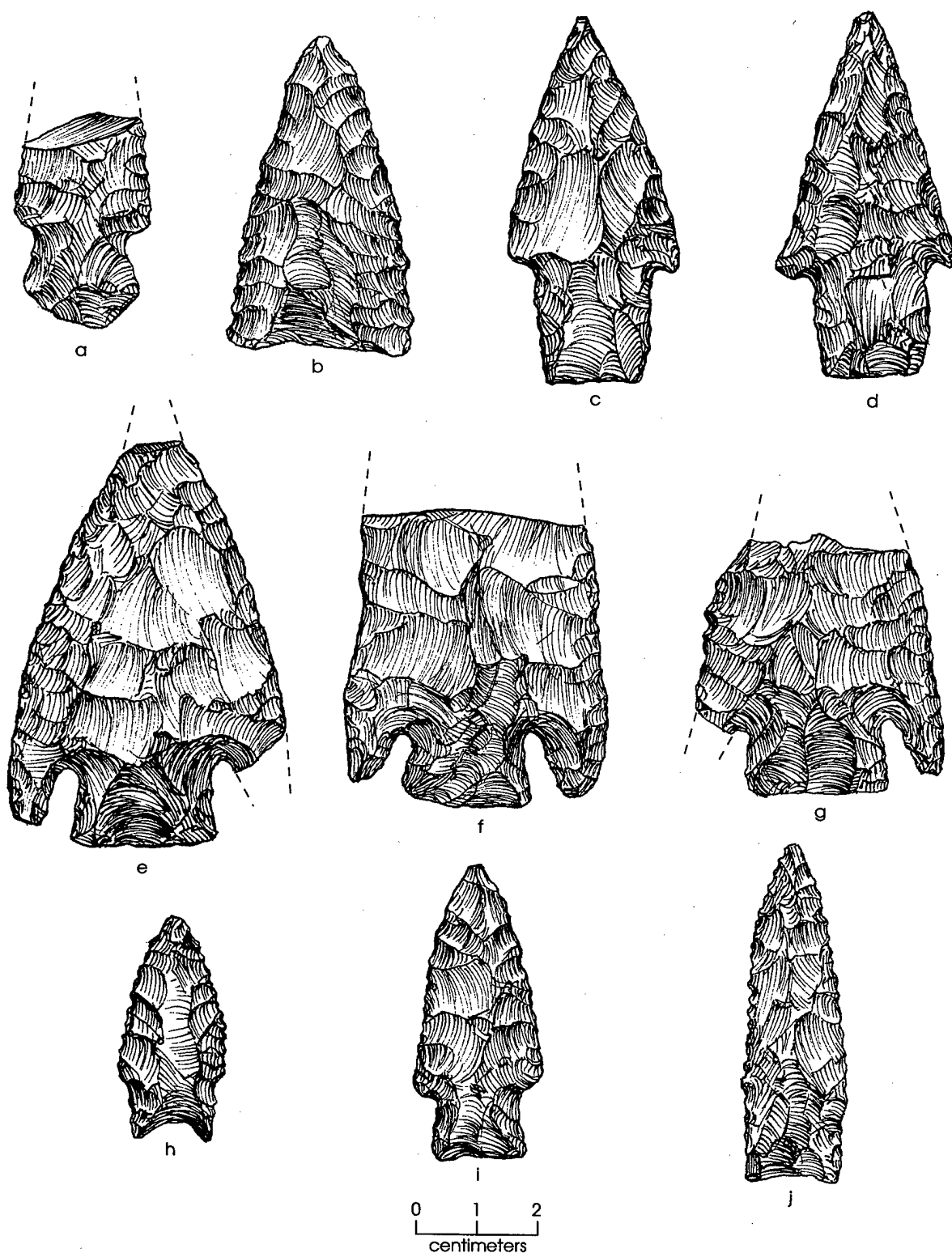
***Ellis***

This proximal point fragment has an expanding stem and a straight base (Figure 128e). Its blade is narrow with short barbs.

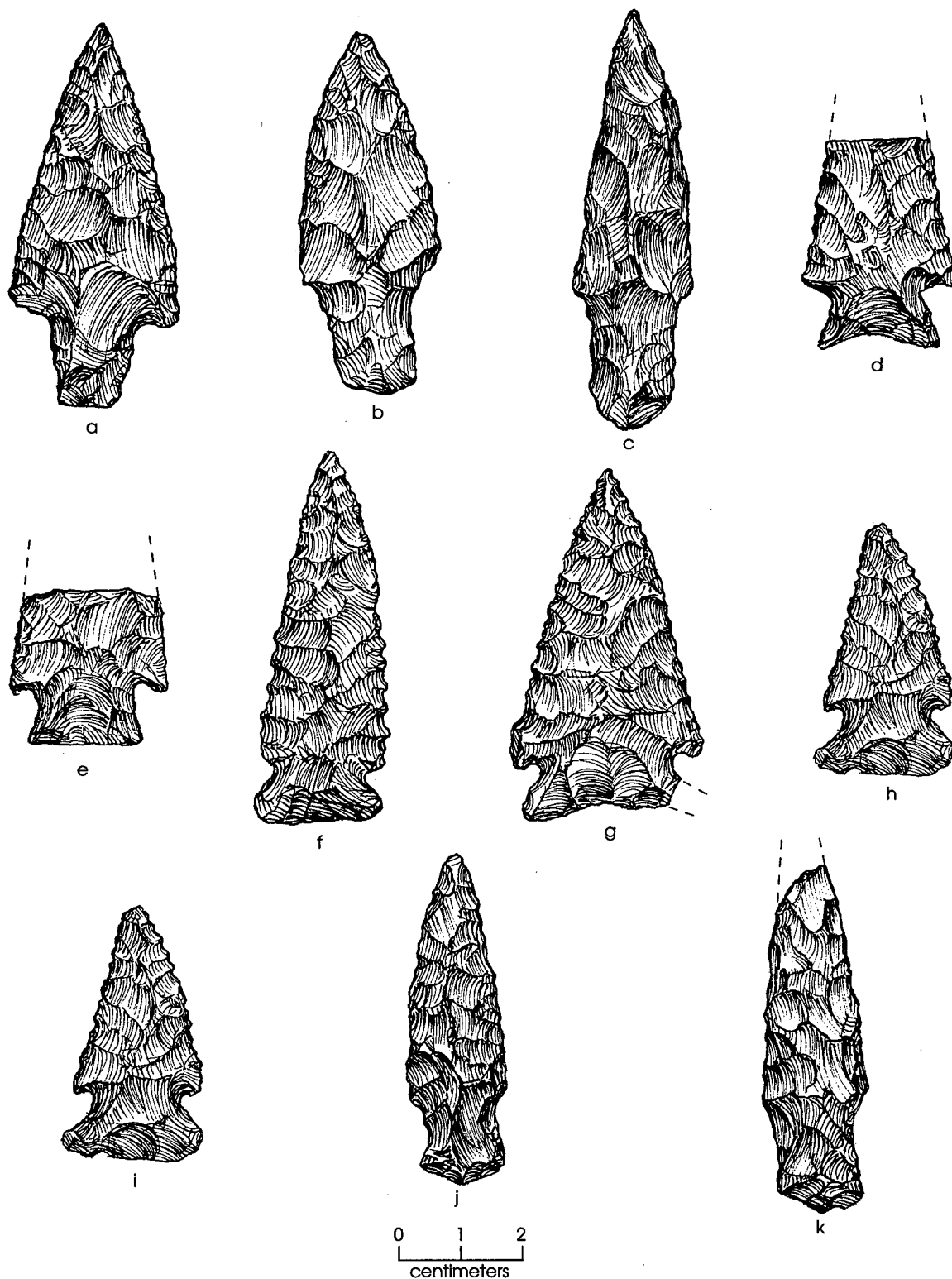
***Ensor***

Of the eight Ensor points recovered, two are complete, four are nearly complete, and two are proximal fragments. All have broad, slightly expanding stems, weak to moderate shoulders, and short barbs (Figure 128f-i). The bases range from shallowly concave to gently convex and from 19.6-24.4 mm in width. Four specimens have alternately beveled blade edges that are serrated; a fifth specimen has serrated edges.





**Figure 127.** Dart points. (a) Axtell, 41CV1275; (b) Baird, 41CV578; (c) Bulverde, 41CV1133; (d) Bulverde, 41CV1275; (e) Castroville, 41CV1120; (f) Castroville, 41CV1269; (g) Castroville, 41CV1122; (h-i) Darl, 41CV988; (j) Darl, 41CV1191.



**Figure 128.** Dart points. (a) Dawson, 41CV1191; (b–c) Dawson, 41CV1235; (d) Edgewood, 41CV1269; (e) Ellis, 41CV984; (f) Ensor, 41CV988; (g) Ensor, 41CV1106; (h) Ensor, 41CV1269; (i) Ensor, 41CV1275; (j) Godley, 41CV1050; (k) Godley, 41CV1275.

### **Godley**

Two Godley points—one complete and one nearly complete—have expanding stems, strongly convex bases, narrow blades, and weak shoulders (Figure 128j, k). One specimen has alternately beveled blade edges.

### **Golondrina**

The proximal third of a Golondrina recovered from 41CV1275 is the only late Paleoindian point recovered during the 1996 testing project. Its stem has prominent flaring ears and heavily ground edges; its base is shallowly concave (Figure 129a).

### **Gower**

Both of the Gower points are nearly complete (Figure 129b, c). They are characterized by expanding stems, wide blades, and weak to short-barbed shoulders. One specimen has a deeply concave base, while the base of the other point is shallowly concave. The blade edges of one specimen are reworked (see Figure 129c).

### **Hoxie**

The two Hoxie points are nearly complete (Figure 129d, e). Both have contracting stems with ground edges, narrow blades with alternate steeply beveled edges, and concave bases.

### **Marcos**

This complete point (Figure 129f) has a broadly expanding stem relative to its narrow neck (neck width = 17.9 mm; base width = 25.2 mm). Its blade is very wide (46.3 mm) and it has prominent shoulders with short barbs and a gently convex base.

### **Marshall**

Of the four Marshall points recovered, one is nearly complete and three are proximal fragments (Figure 129g). All have slightly expanding stems, wide blades, prominent barbs varying from short to long, and shallow concave bases ranging from 17.5 to 22.9 mm in width.

### **Montell**

Two Montell points are proximal fragments,

but morphology can only be described for one since the other is too fragmentary. Characteristics of the more complete specimen include an expanding stem, wide blade, short barbs, and a deeply notched base (Figure 129h).

### **Pedernales**

The 27 Pedernales points comprise the largest sample of a single point type from the 1996 testing project (Figure 130). Seven are complete, 4 are nearly complete, 1 is a medial fragment, and 15 are proximal fragments. They all conform to the same general morphological pattern, but there is considerable variation within this type. Stems range from straight or very slightly contracting to expanding, and neck widths range from 15.3–22.3 mm. They have narrow to wide blades (22.2–40.1 mm) and weak to prominent shoulders with occasional short barbs. Bases range from shallowly to deeply concave. Two specimens have reworked blade edges. One of the nearly complete Pedernales points from 41CV1235 (see Figure 130e) is made of a nonlocal material characterized by a fairly homogeneous grayish olive color that is unlike any chert type currently defined for Fort Hood.

### **Travis**

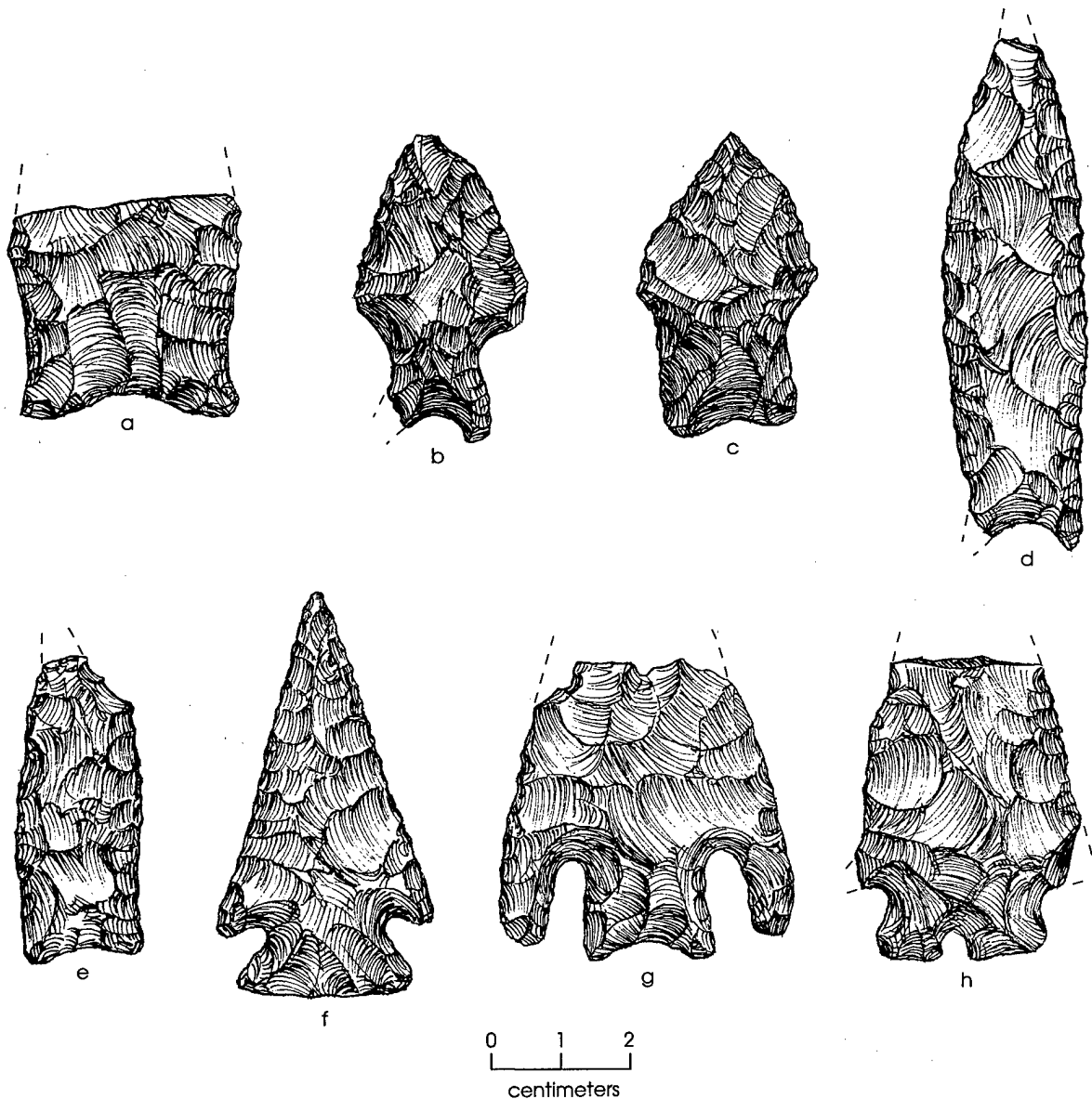
Of the five Travis points, one is complete, three are nearly complete, and one is a proximal fragment (Figure 131a, b). The stems of these points range from slightly contracting to slightly expanding. All of the blades are relatively narrow, the shoulders are weak, and the bases are gently convex.

### **Victoria**

This complete point has a slightly expanding stem, steeply beveled narrow blade, weak shoulders, and a shallowly concave base (Figure 131c). Its tip has been reworked.

### **Zephyr**

Two Zephyr points consist of one complete specimen (Figure 131d) and one proximal fragment. Both have slightly expanding stems, narrow blades, and short barbs. The bases range from straight to shallowly concave.



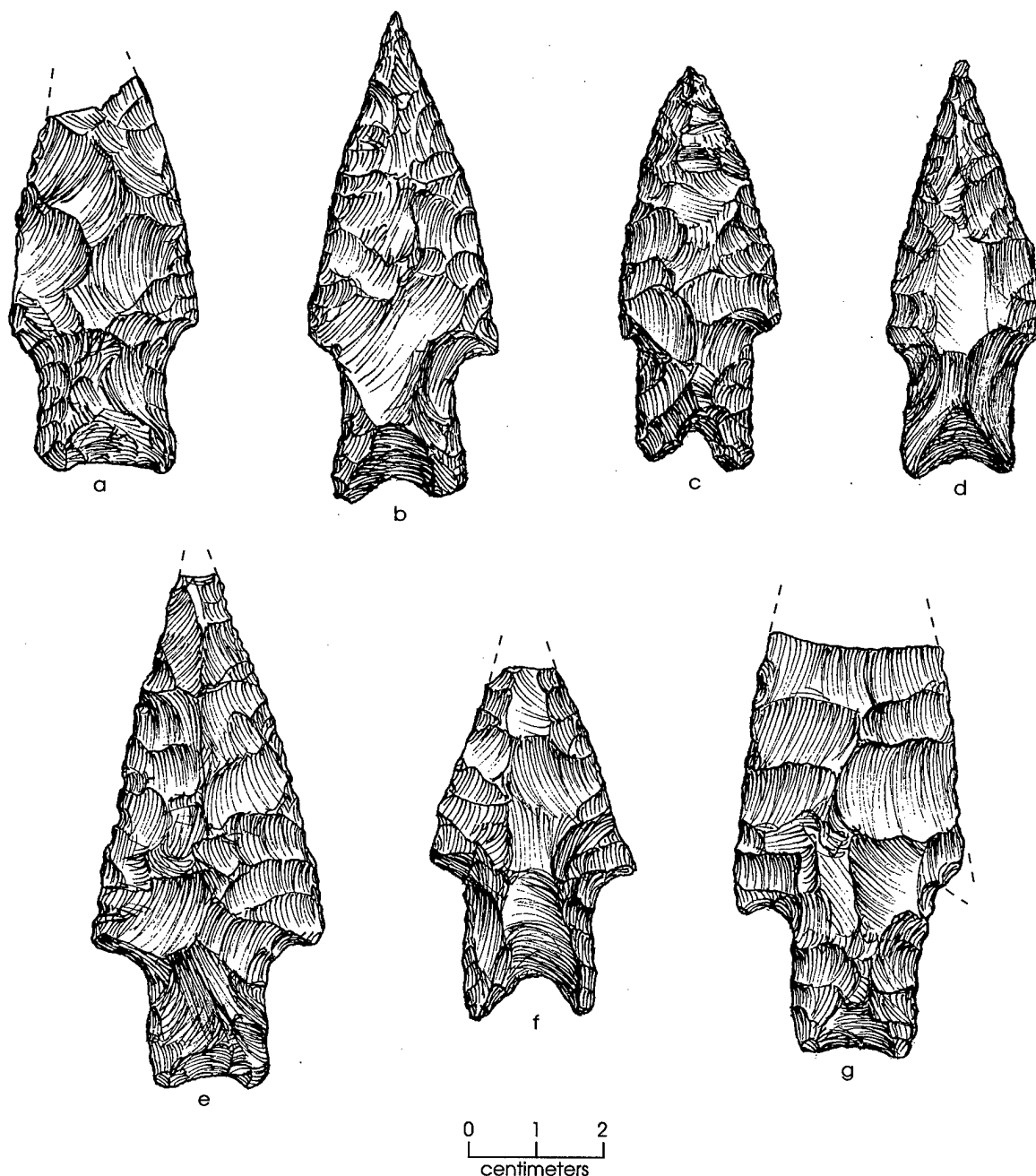
**Figure 129.** Dart points. (a) Golondrina, 41CV1275; (b) Gower, 41CV1219; (c) Gower, 41CV1235; (d-e) Hoxie, 41CV1275; (f) Marcos, 41CV1269; (g) Marshall, 41CV1269; (h) Montell, 41CV1269.

### *Provisional Type 1*

Eleven specimens recovered from five sites are classed as Provisional Type 1. These dart points are characterized by straight to slightly convex lateral edges, weak to strong unbarbed shoulders, rectangular to slightly expanding stems with straight to slightly concave edges, and straight to slightly convex bases (Figure 132). These specimens range considerably in size but are consistent in overall morphology. Six complete

specimens range in maximum length from 47.8–84.2 mm. Other metric attributes of the Provisional Type 1 points are as follows: blade length, 31.5–69.2 mm; blade width, 17.0–24.9 mm; haft length, 12.9–20.6 mm; neck width, 11.2–14.6 mm; base width, 12.7–17.7 mm; and thickness, 6.3–9.3 mm.

In terms of their proveniences and inferred age/cultural affiliation, eight of the Provisional Type 1 points are from reasonably well dated stratigraphic contexts while three specimens are not. Two specimens from burned rock middens

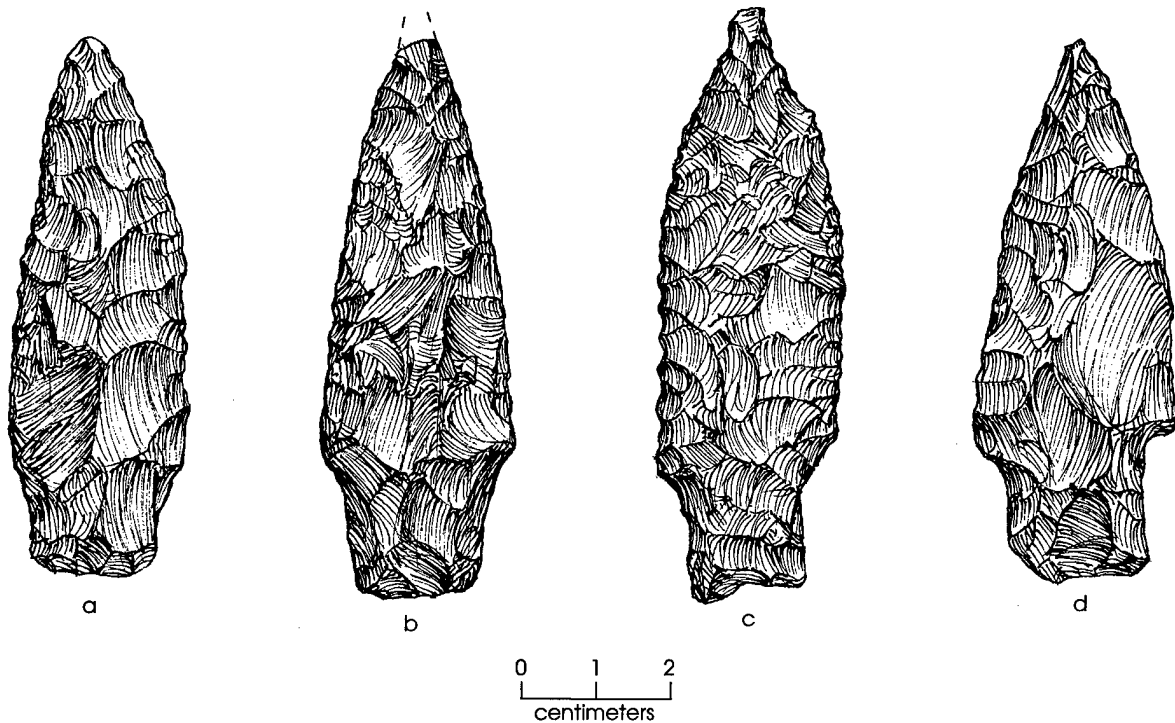


**Figure 130.** Pedernales dart points. (a) 41CV1122; (b) 41CV1133; (c–e) 41CV1235; (f–g) 41CV1269.

at 41CV1221 (Feature 1) and 41CV1286 (Feature 2) cannot be dated with any degree of confidence. The specimen from 41CV1191 was recovered from 20–30 cm in a burned rock midden (Feature 1). Although a radiocarbon assay of midden charcoal from 30–40 cm in the same unit produced a date of 1510–1415 B.C. (calibrated, see Appendix A), the association between the date

and the point is less than ideal, and the date does not necessarily reflect the age of the point.

At 41CV1269, a Provisional Type 1 point was recovered from stratified alluvial deposits at 247 cm in Test Unit 3, just below a Travis point recovered from 230–240 cm. Charcoal recovered from a hearth (Feature 5) at 170–180 cm in the same test unit was radiocarbon dated to 2205–



**Figure 131.** Dart points. (a) Travis, 41CV1235; (b) Travis, 41CV1269; (c) Victoria, 41CV1218; (d) Zephyr, 41CV957.

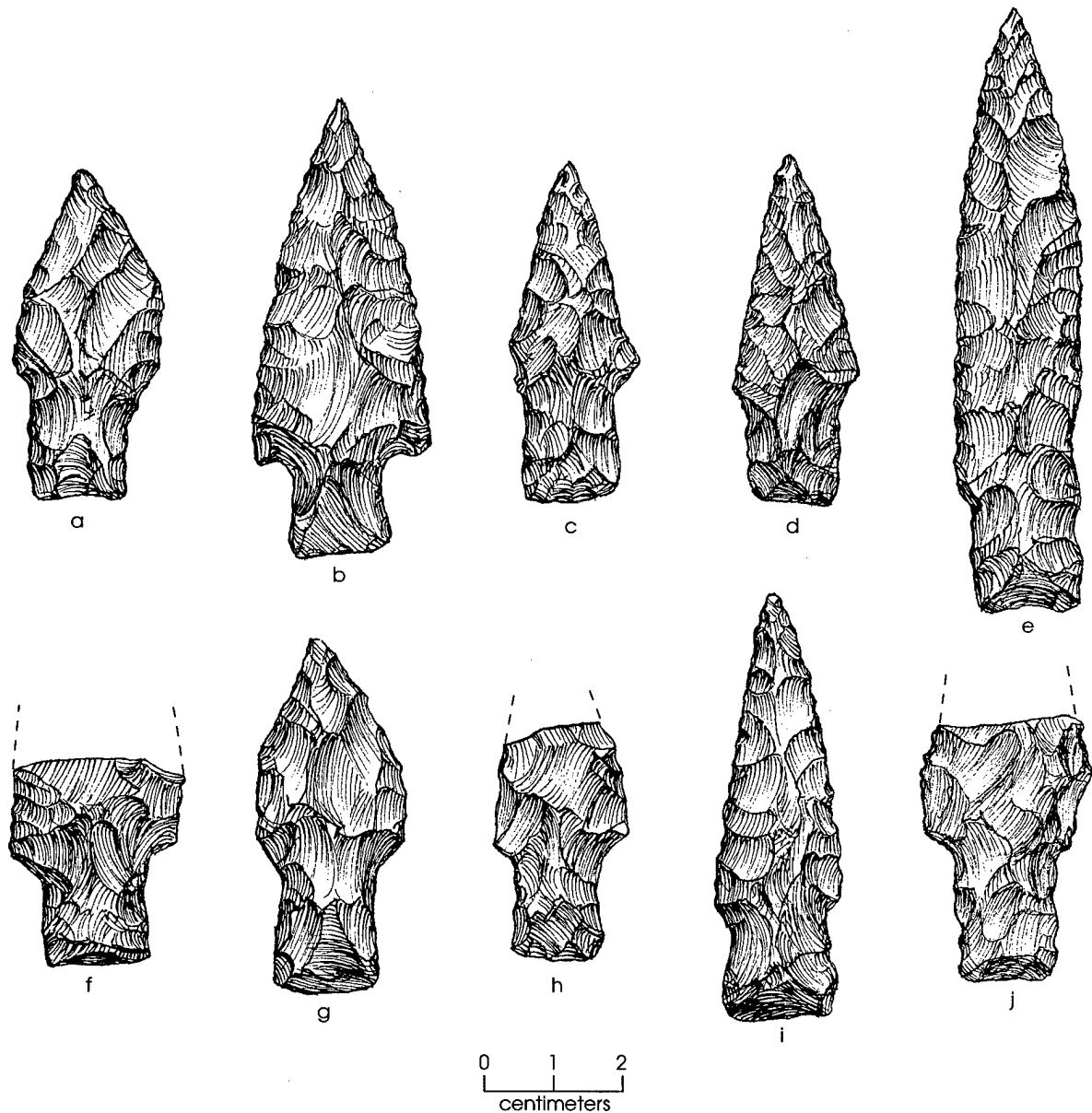
2040 B.C. (calibrated, see Appendix A). Since the point was found ca. 70 cm below the dated stratum, the radiocarbon date provides a minimum estimate for the age of the point, but it could be considerably older.

The seven Provisional Type 1 specimens recovered from alluvial sediments at 41CV1235 provide the most reliable stratigraphic and chronological evidence. The ages of these points are known through association with radiocarbon-dated hearths in several excavation levels. The Provisional Type 1 point from Analysis Unit 1 was found near the bottom of a thick burned rock midden (Feature 1) and is roughly associated with a radiocarbon date of 2400–2205 B.C. (calibrated, see Appendix A) from the base of the midden. All six points from Analysis Unit 2 were recovered in Levels 7 through 9 (60–90 cm below surface) in contiguous Test Units 1 and 2. Charcoal from a hearth (Feature 7) in Level 11 is radiocarbon dated to 3335–3070 B.C. (calibrated, see Appendix A), which indicates that all of the points are younger than this. Two additional charcoal dates are from the same levels as the points. A radiocarbon date of 2865–2585 B.C. is associated with a hearth (Feature 5)

from 79–90 cm, and a radiocarbon date of 2400–2205 B.C. is associated with a hearth (Feature 1) from 60–70 cm. Thus, Provisional Type 1 points were apparently in use at 41CV1235 around 3000–2000 B.C.

Similar points have been called Bulverde-like or Carrollton-like in previous investigations in Central Texas, but they have long been recognized as being somewhat distinctive from Bulverde, Carrollton, and other point styles (Elton R. Prewitt, personal communication 1997). Specimens that are essentially the same as Provisional Type 1 have been recovered from several sites near Fort Hood, including the Youngsport site in Bell County (Shafer 1963), the Landslide and Evoe Terrace sites at Stillhouse Hollow Reservoir in Bell County (Sorrow et al. 1967), and the Cervenka and Hawes sites on the San Gabriel River in Williamson County (Peter 1982). These points, which conform to the Fort Hood Provisional Type 1 class, and the contexts in which they were recovered are summarized below.

Two “unidentified” points from the Youngsport site (Figure 133a, b) “are characterized by long, roughly rectangular stems, and small

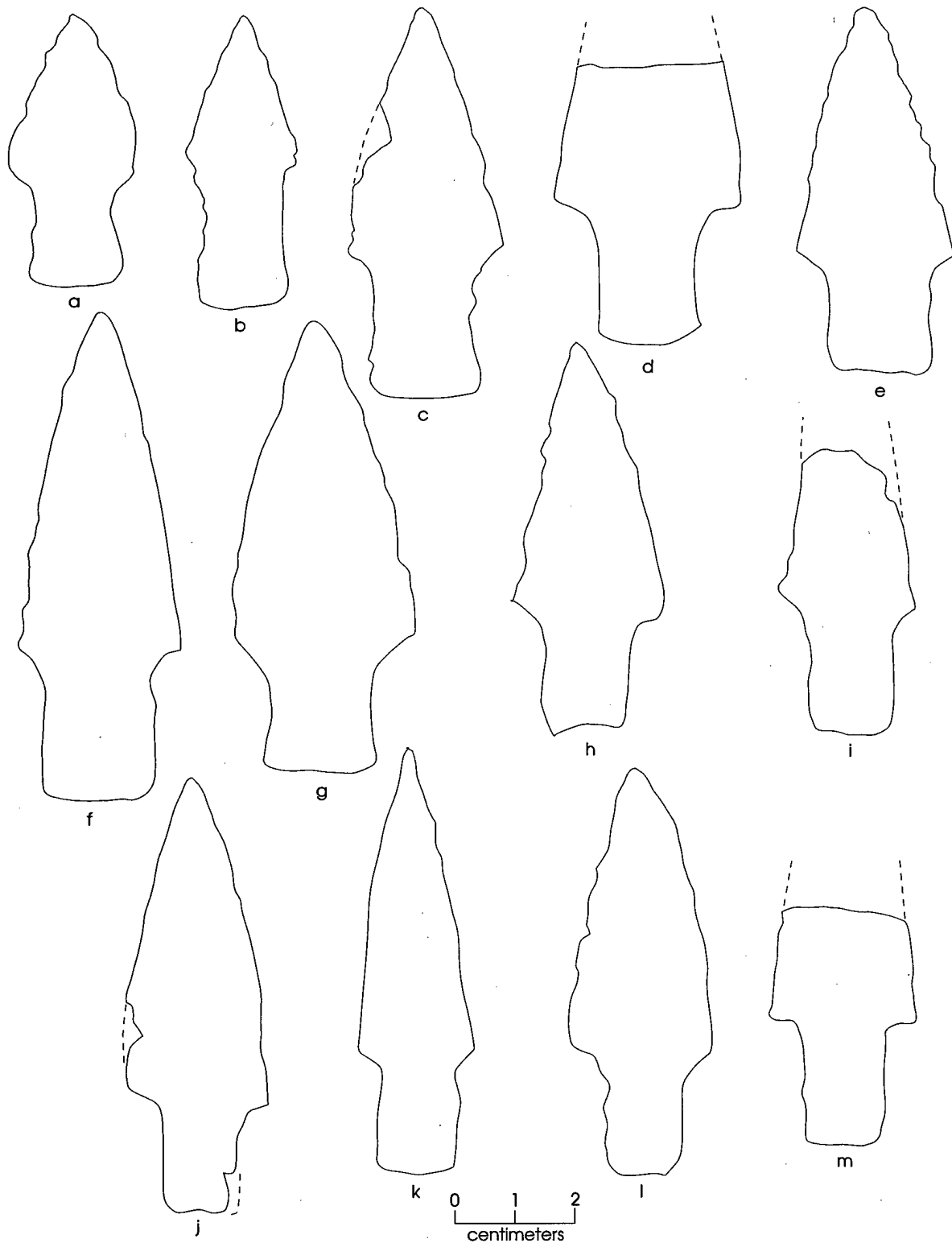


**Figure 132.** Provisional Type 1 dart points. (a) 41CV1191; (b) 41CV1221; (c–h) 41CV1235; (i) 41CV1269; (j) 41CV1286.

triangular blades” (Shafer 1963:71). Investigators noted that they were like Carrollton points but smaller and lacking basal smoothing. These points were recovered from Stratum 8 along with an untyped expanding-stem dart, a Morrill, and two Wells points. Above this, Strata 4 and 5 produced one Travis, two untyped, two Nolan, and five Bulverde points. These points were in good context and seem to be in correct stratigraphic order. This evidence suggests that the

two untyped points may actually predate the Nolan, Travis, and Bulverde points at this locality. Notably, Collins (1995:Table 2) used evidence from the Youngsfort site to define the “Bulverde interval” for central Texas.

“Bulverde-like 1” and “Bulverde-like 2” points from the Landslide site (Sorrow et al. 1967:14, 17) are basically the same as the Fort Hood Provisional Type 1 (Figure 133c–m). Fourteen specimens were recovered from Landslide,



**Figure 133.** Carrollton- and Bulverde-like dart points that conform to the morphology of Provisional Type 1 (tracings made from illustrations). (a–b) Carrollton-like points from the Youngsport site (Shafer 1963:Figure 6C and D); (c–m) “Bulverde-like” points from the Landslide site (Sorrow et al. 1967:Figure 11a–k). Specimens c–g were originally typed as Bulverde-like 1, while specimens h–m were typed as Bulverde-like 2.



but only 11 were found in good context, in Strata II, IIIa, and IIIb. Nine of these specimens were found in Stratum IIIa, along with 2 Pedernales (variants), 2 Bulverde, 2 Nolan, 2 Travis, and 1 Tortugas. Ten Bell points and 3 "Untyped Group 3" specimens (which are decidedly similar to Taylor points) were found in Stratum IIIb below the concentration of Bulverde-like 1 and 2 points, and 6 Pedernales points were found above in Stratum II. Thus, it appears that the Bulverde-like 1 and 2 points at the Landslide site fall stratigraphically between Bell/Taylor and Pedernales, but are from the same general time period as Nolan, Travis, and Bulverde. The three Bulverde-like 3 points found at the Landslide site occur in Strata II, IIIa, and IIIb (one in each stratum). The Bulverde-like 3 points are very similar to the Bulverde-like 1 and 2 points but have longer stems relative to their total length.

Bulverde-like 1, Bulverde-like 2, and Untyped Group 12 points recovered at the nearby Evoe Terrace site (Sorrow et al. 1967:74, 80) may also be placed into the Fort Hood Provisional Type 1 class (Figures 134 and 135). In Areas A and C of this site, two Untyped Group 12 points were found in excavations Levels 11 and 12 along with two Bulverde points.

As described by Sorrow et al. (1967:14, 74), the Bulverde-like 1 and 2 points from the Landslide and Evoe Terrace sites are virtually identical to the Fort Hood Provisional Type 1. The Untyped Group 12 specimens from the Evoe Terrace site also are nearly identical, except that the stems of some specimens are slightly more expanding. The stratigraphic evidence from these two sites clearly indicates that all of these specimens (i.e., the Bulverde-like 1 and 2 and Untyped Group 12) were found in association with and used during the same general time period as Bulverde, Nolan, and Travis points.

Untyped "Group 4" ( $n = 30$ ) and "Group 14" ( $n = 14$ ) points from the Cervenka and Hawes sites (Peter 1982:14-13 through 14-22) along the San Gabriel River in Williamson County also conform to the morphology of the Fort Hood Provisional Type 1 (Figure 136a-d). Group 4 points were found at both sites, but the 23 specimens from the Cervenka site are most informative. Fourteen were from Excavation Unit D, and 8 of these specimens were from good stratigraphic contexts attributed to late San Geronimo and Clear Fork Phases. Although there was some

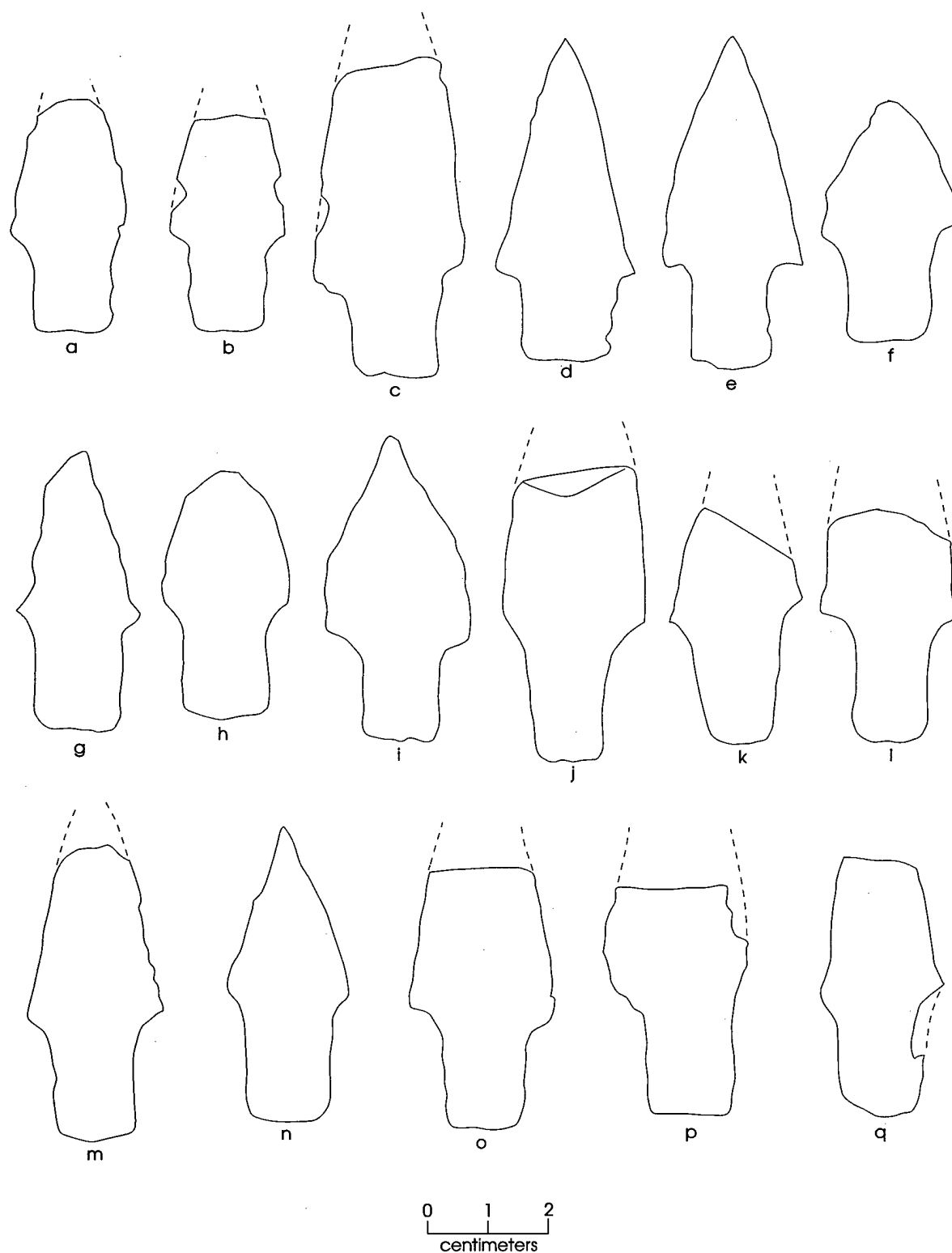
mixing of deposits, the overall stratigraphy looked quite good. The Group 4 points from Excavation Unit D at the Cervenka site were stratigraphically associated with Bulverde, Nolan, Travis, Uvalde, Morrill, Dawson, and Hoxie points (Peter 1982:Tables 9.10-1). At the Hawes site, 15 "Group 14" and 5 "Group 4" points were recovered from various areas. Again, some mixing of deposits was evident but the overall stratigraphy was generally good. These points were recovered from late San Geronimo and Clear Fork phase zones, along with numerous Bulverde, Nolan, and Travis points as well as several Pedernales. Based on radiocarbon dates from these sites, Peter (1982:17-6) places the time of the Clear Fork phase occupations at around 5000-4000 B.P.

Six "Bulverde-like" dart points found in the Upper Navasota Reservoir in Leon, Limestone, and Robertson Counties of northeast Texas (Prewitt 1974:57) also conform to the Provisional Type 1 defined here (Figure 136e-j). These specimens were surface collected from various sites so their chronological contexts are unknown. However, they represent the most easterly occurrences of this dart point style.

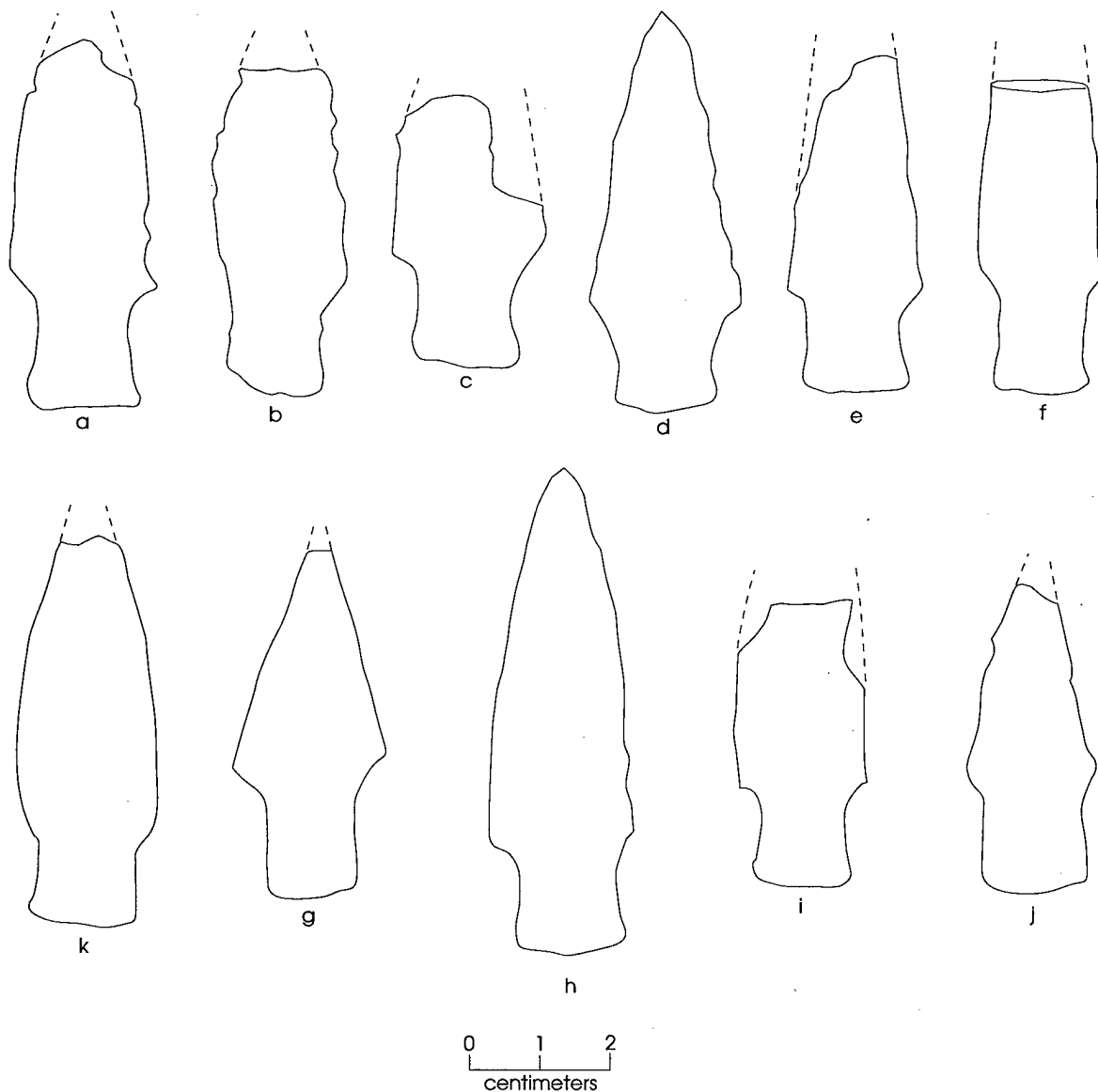
Based on stratigraphic and chronological contexts of Provisional Type 1 points at Fort Hood and in other central Texas sites, it appears that this dart point style corresponds to the Bulverde and Nolan/Travis intervals at approximately 5500-3200 B.P. as defined by Collins (1995:Table 1). Points fitting the Provisional Type 1 morphology have long been recognized as being distinctive but have never been formally defined as a type. This class of points is proposed here as a provisional type (rather than a formally named type) because some problems with the type remain to be resolved.

Provisional Type 1 points are sufficiently similar in morphology to three north-central and/or northeast Texas dart point styles—Dawson, Carrollton, and Yarbrough—to warrant some additional discussion. All three styles were originally defined as east/northeast Texas types, but their geographic ranges have now been extended westward into the Fort Hood area (see Prewitt 1995:96, 100, 137).

Provisional Type 1 points are similar to Dawson points except that the latter have parallel to slightly contracting stems that are often slightly bulbous. Provisional Type 1 points also are similar to Carrollton points except that the



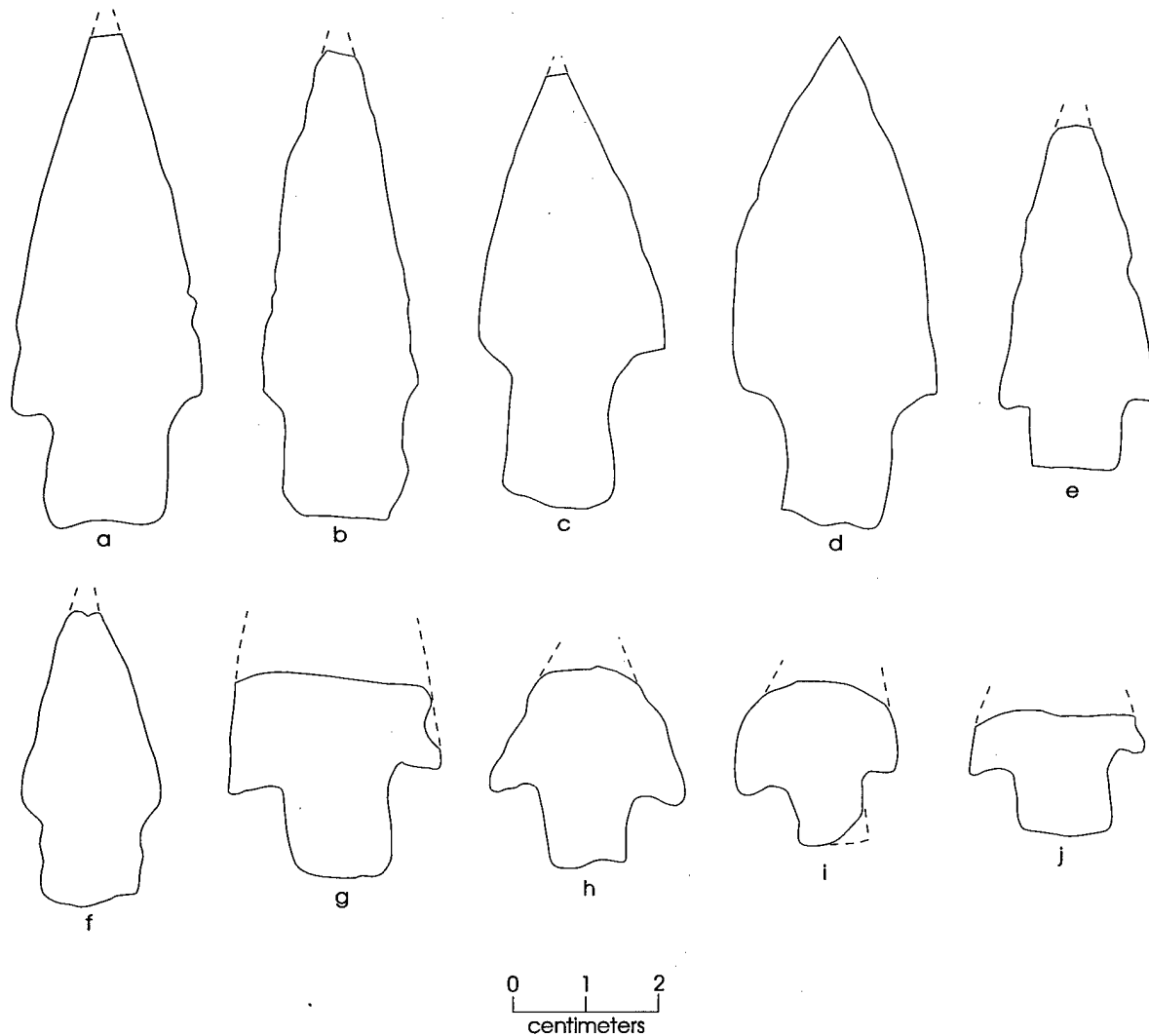
**Figure 134.** "Bulverde-like" points from the Evoe Terrace site that conform to the morphology of Provisional Type 1 (tracings made from illustrations) (Sorrow et al. 1967:Figures 44d-p and 45a-d). Specimens a-i were typed as Bulverde-like 1, while specimens j-q were typed as Bulverde-like 2.



**Figure 135.** "Untyped Group 12" points from the Evoe Terrace site that conform to the morphology of Provisional Type 1 (tracings made from illustrations) (Sorrow et al. 1967:Figures 47q-s and 48a-h).

latter have wider blades, more-prominent shoulders, and often exhibit basal smoothing. The dating of these styles is not secure, but Carrollton points are thought to represent a Middle Archaic style, while Dawson points are a Middle to Late Archaic style (e.g., Fields et al. 1997:Table 4; Prikryl 1990:Figure 24; Turner and Hester 1993:85, 101). The precise age of Carrollton points in north-central Texas is extremely tenuous, being based on little chronological data (Prikryl 1990:52-53). The temporal range of Dawson point use in north-central and northeast

Texas is somewhat better understood. Dawson points may appear as early as the end of the Middle Archaic period (ca. 4000 B.P.) but are primarily associated with Late Archaic occupations (ca. 3600-2100 B.P.) and perhaps even continue in use into the Woodland period (Fields and Klement 1995:94; Fields et al. 1997:42-43). Provisional Type 1 is distinctive enough to suggest that it represents something different from Dawson and Carrollton, but the temporal and cultural relationships between these similar styles remain unclear. Albeit skimpy, current



**Figure 136.** Points from the Cervenka and Hawes sites and the Upper Navasota Reservoir that conform to the morphology of Provisional Type 1. (a-b) "Group 4" points from the Cervenka site (Peter 1982:Figure 14.1-3a-b); (c-d) "Group 14" points from the Hawes site (Peter 1982:Figure 14.1-4g-h); (e-j) "Bulverde-like" points from various sites in the Upper Navasota Reservoir (Prewitt 1974:Figure 5b-g).

data suggest that the Provisional Type 1 style in central Texas may be coeval with Carrollton points and probably predates Dawson points in north-central and northeast Texas.

Provisional Type 1 points are most similar to Yarbrough points, and there is a great deal of morphological overlap between these styles, as a few comparisons demonstrate. Although their stratigraphic contexts and chronology are not precise, the lindale variety of Yarbrough (98 specimens) defined at the Yarbrough site in Van Zandt County (cf. Johnson 1962:Figure 6j-l, 173) closely conforms to the morphology of the

Provisional Type 1 specimens described above. Surveys at Belton Reservoir in Bell and Coryell Counties yielded 16 Yarbrough points (cf. Shafer et al. 1964:Figure 6e-m), and the lindale variety specimens are especially similar to Provisional Type 1. Still other Yarbrough points (dike and lindale varieties) from the Upper Navasota Reservoir (n = 5) also are similar (cf. Prewitt 1974: Figure 6v-z). Given these similarities, what are the significant differences (if any) between Yarbrough points and the Provisional Type 1 specimens illustrated here? The primary differences are that Yarbrough points generally

have shorter stems and often have beveled blades (although it is notable that one complete Bulverde-like 2 point from the Evoe Terrace site [see Figure 134n; Sorrow et al. 1967:Figure 45a] also has a beveled blade).

While Suhm and Jelks (1962:261) indicate that Yarbrough is an east Texas type, Prewitt (1995:137) more recently mapped the distribution of Yarbrough points across all of the northeastern portion of Texas and west and south beyond the Fort Hood area. Points typed as Yarbrough are common in Bell, Coryell, and Williamson Counties. Thus, the geographic ranges of Provisional Type 1 and Yarbrough points overlap considerably and are not, in and of themselves, a valid means of differentiating the two types.

Unfortunately, the relationship between Provisional Type 1 and Yarbrough is largely unknown due primarily to chronological problems with the latter. In his synthesis of north-central Texas prehistory, Prikryl (1990:Figure 24) places the age of Yarbrough points at around 3500 B.P. Other chronological evidence places the age of Yarbrough points as early as 3700 or 3600 B.P. to as late as 2100–2000 B.P. in northeast Texas (Fields and Klement 1995:94; Gadus et al. 1992:69–70). This chronological evidence is admittedly tenuous but suggests that Provisional Type 1 points from Fort Hood and other central Texas sites may predate Yarbrough points in north-central and northeast Texas. However, if Yarbrough points are found in earlier (i.e., Middle Archaic) contexts in these areas, they might prove to be essentially coeval with Provisional Type 1. In this case, Provisional Type 1 would be more appropriately viewed as a variant of Yarbrough.

In conclusion, it appears that the Provisional Type 1 points recovered at Fort Hood and other central Texas sites represent a coherent morphological class that occurs, stratigraphically and chronologically, in the Bulverde interval (ca. 4000–3300 B.P.), perhaps even appearing slightly earlier during the Nolan-Travis interval (ca. 5500–4000 B.P.) (see Figure 3). These points are similar to, yet distinct from, the central Texas Bulverde type and the east Texas Carrollton and Dawson types. They are most similar to the Yarbrough type, which is commonly found to the east and northeast of the Fort Hood area (see Prewitt 1995:96, 100, 137). Better chronological data and larger samples of Provisional Type 1

points (i.e., many specimens from well-dated stratigraphic contexts) must be examined before the temporal and cultural contexts of this style can be fully understood. For a new point type to be valid, it must have not only a distinctive set of morphological traits, but also a definable geographic distribution and a firm chronological placement. Provisional Type 1 may eventually prove to be a valid type for central Texas, but the current archeological evidence is insufficient to support the naming of a new type.

### Untyped Group 1

Two proximal fragments are classified as Untyped Group 1 (Figure 137). They have long expanding stems with convex bases, and all stem and base edges are heavily ground. Their stems have a rounded appearance similar to the stems of Axtell points, but the Untyped Group 1 specimens have longer, less-bulbous stems and appear to be more finely worked.

Although the archeological contexts of these points (one from 41CV1133 and one from 41CV1275) are not particularly informative, a similar specimen from the Landslide site (cf. Sorrow et al. 1967:23, Figure 15b) suggests that they are rather old. This specimen was found in a cultural zone (Stratum IIIb) along with numerous Bell points (a Middle Archaic style in Collins's chronology, see Figure 3) and a Bulverde-like point that conforms to the Provisional Type 1

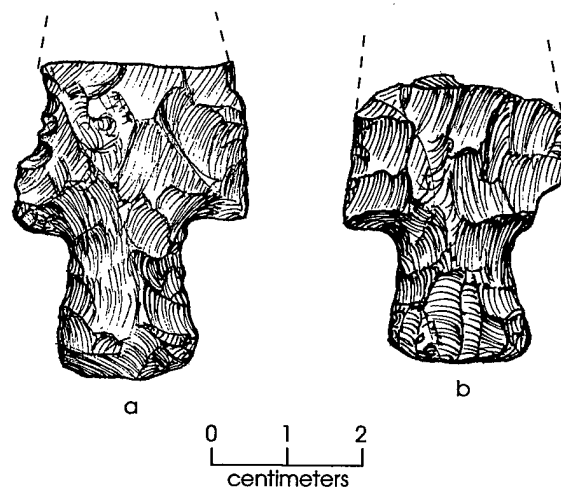


Figure 137. Untyped Group 1 dart points. (a) 41CV1133; (b) 41CV1275.

above. This specimen was found below Stratum IIIa where nine other Bulverde-like (cf. Provisional Type 1) points were recovered (Sorrow et al. 1967:Table 1). Consequently, it appears that Untyped Group 1 may represent a Middle Archaic style.

Seven dart points (three complete and four proximal fragments) are classed as untyped and are described individually below. One complete specimen (from 41CV578) has an expanding stem, a straight base, and a narrow blade with abrupt shoulders. The second complete specimen (from 41CV1275) has an expanding stem, a shallowly concave base, and a wide blade with abrupt shoulders. The third complete specimen (from 41CV1283) has a contracting stem, gently convex base, and a thick wide blade with abrupt shoulders.

The four proximal fragments include two specimens with portions of the bases, stems, and blades intact, and two even more fragmentary specimens with only portions of their stems/bases intact. The first specimen (from 41CV1219) is a lanceolate point that has been extensively reworked and subsequently stream tumbled. It has a contracting stem, shallowly concave base, and a narrow blade with absent shoulders. The second specimen (from 41CV1133) has an expanding stem, gently convex base, and a narrow blade with weak shoulders. The third specimen (also from 41CV1133) has an expanding stem and a shallowly concave base. The fourth and final untyped dart point (from 41CV1235) has a slightly expanding stem and a gently convex base.

#### **Untypeable Dart Points**

A total of 36 dart points are too fragmentary to be classified into named types or morphological groups. Of these, 2 are proximal fragments, 6 are medial fragments, 17 are distal tips, 1 is an edge fragment, and 10 are barbs.

#### **Perforators**

Perforators are represented by a complete specimen that was manufactured on a recycled Castroville dart point (Figure 138) and a distal fragment.

#### **Gouge**

This single specimen is a complete, unifacially



**Figure 138.** Perforator on a recycled Castroville dart point, 41CV1269.

worked gouge with a slightly concave bit end. This small gouge (35.3 mm in length) does not fit the morphology of Clear Fork gouges.

#### **Bifaces**

The 138 bifaces recovered (Table 60) are classified as early to middle stage ( $n = 19$ , 13.8 percent), late to finished stage ( $n = 73$ , 52.9 percent), and miscellaneous ( $n = 46$ , 33.3 percent). Ten of the 19 (52.6 percent) early-to middle-stage bifaces are complete, 1 (5.3 percent) is nearly complete, 1 (5.3 percent) is a medial fragment, and 7 (36.8 percent) are indeterminate fragments. Fourteen of the 73 (19.2 percent) late-stage to finished bifaces are complete and 5 (6.8 percent) are nearly complete. Seventeen (23.3 percent) of these specimens are indeterminate fragments, while the other 37 (50.7 percent) are distal, medial, proximal, or edge fragments. While many of the early-stage bifaces are extremely crude, some of the middle-stage bifaces are round to oval in shape (Figure 139a, b). The late-stage to finished bifaces vary considerably in shape, but most are round to ovate or are triangular with one end pointed (Figures 139c-e and 140). None of these late-stage or finished bifaces are classified as named varieties (e.g., Hare and San Gabriel bifaces), but

**Table 60. Summary of bifaces by completeness**

Completeness	Early to Middle Stage	Late Stage to Finished	Miscellaneous	Totals
Complete	10	14	3	27
Nearly complete	1	5	1	7
Proximal fragment	—	14	—	14
Medial fragment	1	14	—	15
Distal fragment	—	6	1	7
Edge fragment	—	3	3	6
Indeterminate fragment	7	17	38	62
Totals	19	73	46	138

several specimens are very distinctive and represent superb flintknapping skills (see Figure 140b). While many of the finished bifaces probably represent dart points that only needed to be notched, others may be complete tools. One specimen is a particularly interesting bifacial tool; it is a very well made, long oval biface (164.0 mm long by 48.3 mm wide and 8.3 mm thick) that has one beveled lateral edge (see Figure 140a). This appears to be a large knife that was resharpened along one edge.

Four of the finished bifaces have alternately beveled blades. Two are complete specimens with low-angle bevels on both distal edges (see Figure 139d, e). These specimens are apparently from Middle to Late Archaic contexts (i.e., Analysis Unit 1 at 41CV1122 and Analysis Unit 2 at 41CV1269). A third specimen is a midsection fragment with steeply beveled edges from a probable Late Archaic into Late Prehistoric context at 41CV578. The fourth specimen (see Figure 140c) is a complete 112-mm-long, two-beveled knife from a probable Toyah phase context (Analysis Unit 1) at 41CV1250. This specimen is typical of the two-beveled knives commonly attributed to Late Prehistoric and Protohistoric bison hunters (Turner and Hester 1993:274–275).

### Unifaces

The 129 unifaces (Table 61) recovered are classified as end scrapers ( $n = 5$ , 3.9 percent), side scrapers ( $n = 8$ , 6.2 percent), end/side scrapers ( $n = 9$ , 7.0 percent), other scrapers ( $n = 2$ , 1.6 percent), and miscellaneous unifaces ( $n = 105$ , 81.4 percent). The 22 end, side, and end/side scrapers

(Figures 141 and 142) all retain flake attributes so that the location of the working edges (i.e., the unifacially worked edges used for scraping) can be defined relative to the flake platform. The end scrapers have distinctive bit edges on their distal ends, while side scrapers have their lateral edges worked. The end/side scrapers have worked distal ends and lateral edges, although in some cases the lateral edge working may represent trimming of the sides of an end scraper rather than true scraping edges.

An impressive assemblage of formal scrapers has been recovered from the testing of a probable Toyah phase component (Analysis Unit 2) at 41CV1286. Six scrapers (one end and five end/side) were recovered during the 1996 testing (see Figure 141) in addition to the eight scrapers (five end, one side, two end/side, and one other) previously recovered from a single 50x50-cm test pit in 1992 by Mariah Associates. All of the unifacial tools from 41CV1286, along with the other tools in the assemblage, are discussed in more detail in Chapter 7 (see Tables 38, 40, and 41).

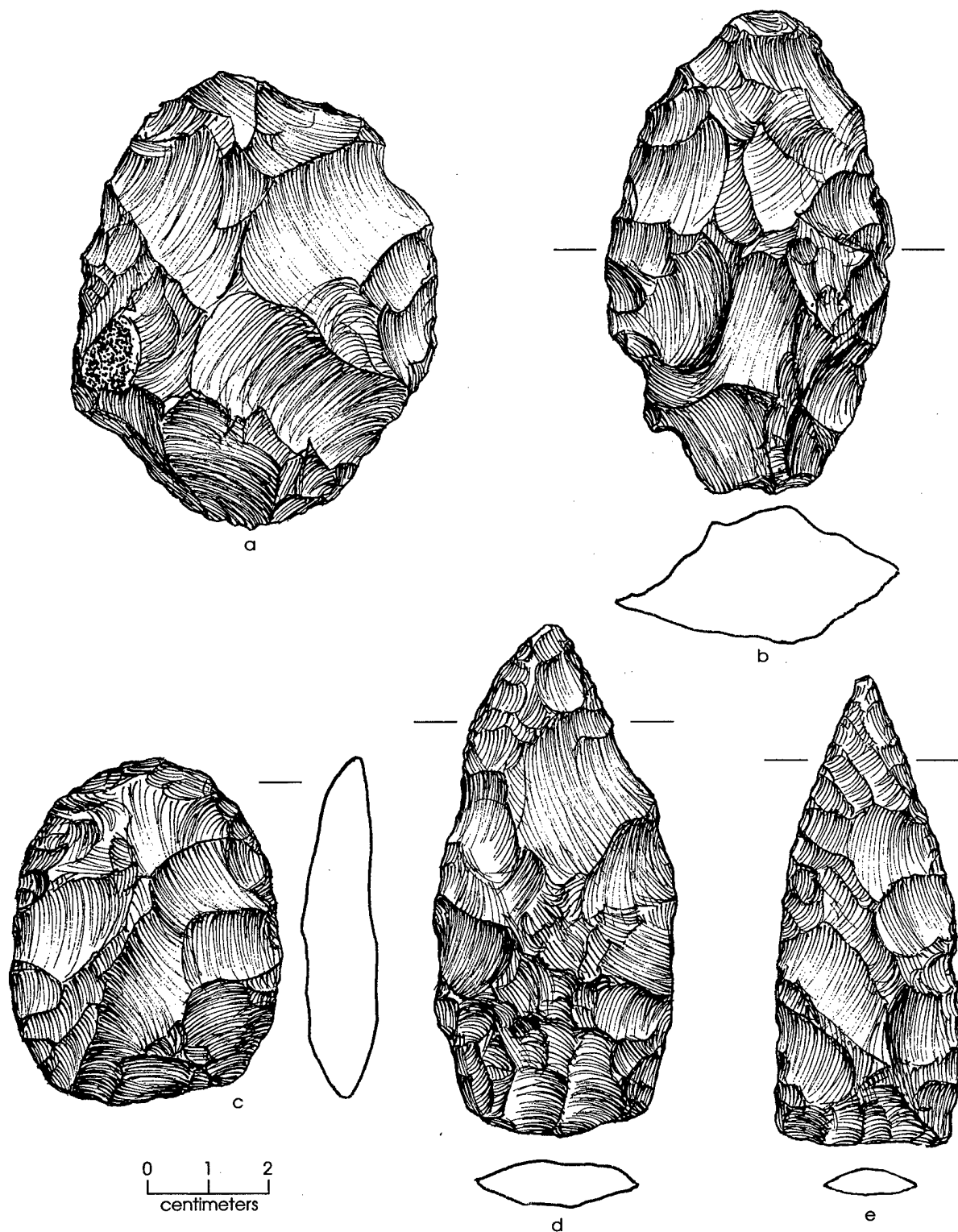
Two specimens not classifiable as end, side, or end/side scrapers are classified as other scrapers (Figure 143), while the remaining 105 specimens are classified as miscellaneous unifaces. One miscellaneous uniface is a chipped limestone tool.

### Spokeshaves

Only 10 spokeshaves were recovered, and the notch on each specimens is unifacially worked. Of these, 2 are complete (Figure 144a), 1 is nearly complete, 2 are medial fragments, 3 are distal fragments, and 2 are indeterminate fragments.

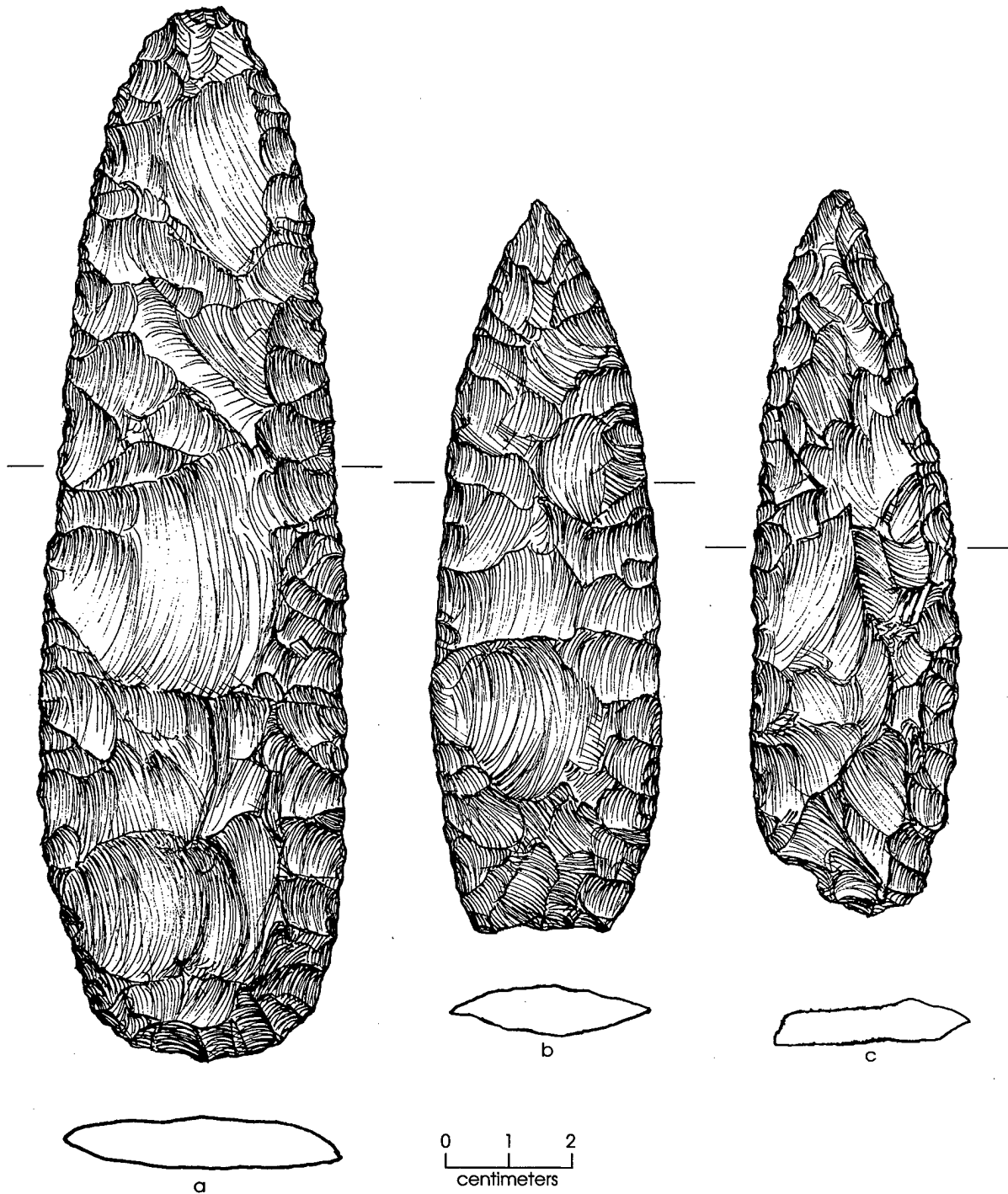
### Gravers and Burins

Eight tools are classified as gravers or burins; six (75 percent) are complete. Four specimens are gravers made on flakes (two from 41CV1269 and one each from 41CV1152 and 41CV1191), while one other graver (from 41CV1275) is made on a Lange dart point (Figure 144b, c). Three specimens are



**Figure 139.** Bifaces. (a–b) early- to middle-stage bifaces from 41CV1152 and 41CV578, respectively; (c–e) late stage to finished bifaces from 41CV1235, 41CV1122, and 41CV1269, respectively.





**Figure 140.** Bifaces. (a–b) Late-stage to finished bifaces from 41CV1133 and 41CV1235, respectively; (c) two-beveled knife from 41CV1250.

burins made on proximal fragments of dart points, including a Castroville (Figure 144d), a Pedernales, and a Zephyr (Figure 144e).

### **Cobble Tools**

The two cobble tools recovered are complete

Table 61. Summary of unifaces by completeness

Completeness	End Scrapers	Side Scrapers	End/Side Scrapers	Other Scrapers	Miscellaneous Unifaces	Totals
Complete	2	2	8	2	23	37
Nearly complete	1	1	-	-	9	11
Proximal fragment	1	3	-	-	23	27
Medial fragment	-	2	-	-	12	14
Distal fragment	-	-	1	-	8	9
Edge fragment	-	-	-	-	5	5
Indeterminate fragment	1	-	-	-	25	26
Totals	5	8	9	2	105	129

and are made on rounded or ovate stream cobbles. These specimens probably represent crude expedient tools that were bifacially flaked to create one or more edges for chopping and/or battering (Figure 145a).

#### Core Tools

Ten (76.9 percent) of the 13 core tools recovered are complete. These specimens are similar to cobble tools in that they have one or more bifacially flaked edges with evidence of battering. They do not appear to be intentionally shaped, however, and seem to be cores that were subsequently used as chopping or battering tools (Figure 145b).

#### Multifunctional Tools

Many chipped stone tools appear to have had two or more possible functions. Of the 26 multifunctional tools recovered, 7 (26.9 percent) are complete and 3 (11.5 percent) are nearly complete. The other specimens are classified as distal ( $n = 7$ , 26.9 percent), medial ( $n = 2$ , 7.7 percent), proximal ( $n = 3$ , 11.5 percent), and indeterminate ( $n = 4$ , 15.4 percent) fragments. The multifunctional tools are summarized by their inferred functions in Table 62.

#### Edge-Modified Flakes

Edge-modified flakes constitute a large portion (34.5 percent) of the 588 chipped stone

tools (excluding points). The 203 edge-modified flakes are expedient tools exhibiting only minimal retouch and/or use wear. They include 40 (19.7 percent) complete and 18 (8.9 percent) nearly complete specimens, but most are fragments classified as proximal ( $n = 53$ , 26.1 percent), medial ( $n = 27$ , 13.3 percent), distal ( $n = 20$ , 9.9 percent), edge ( $n = 6$ , 3.0 percent), and indeterminate ( $n = 39$ , 19.2 percent).

#### Cores

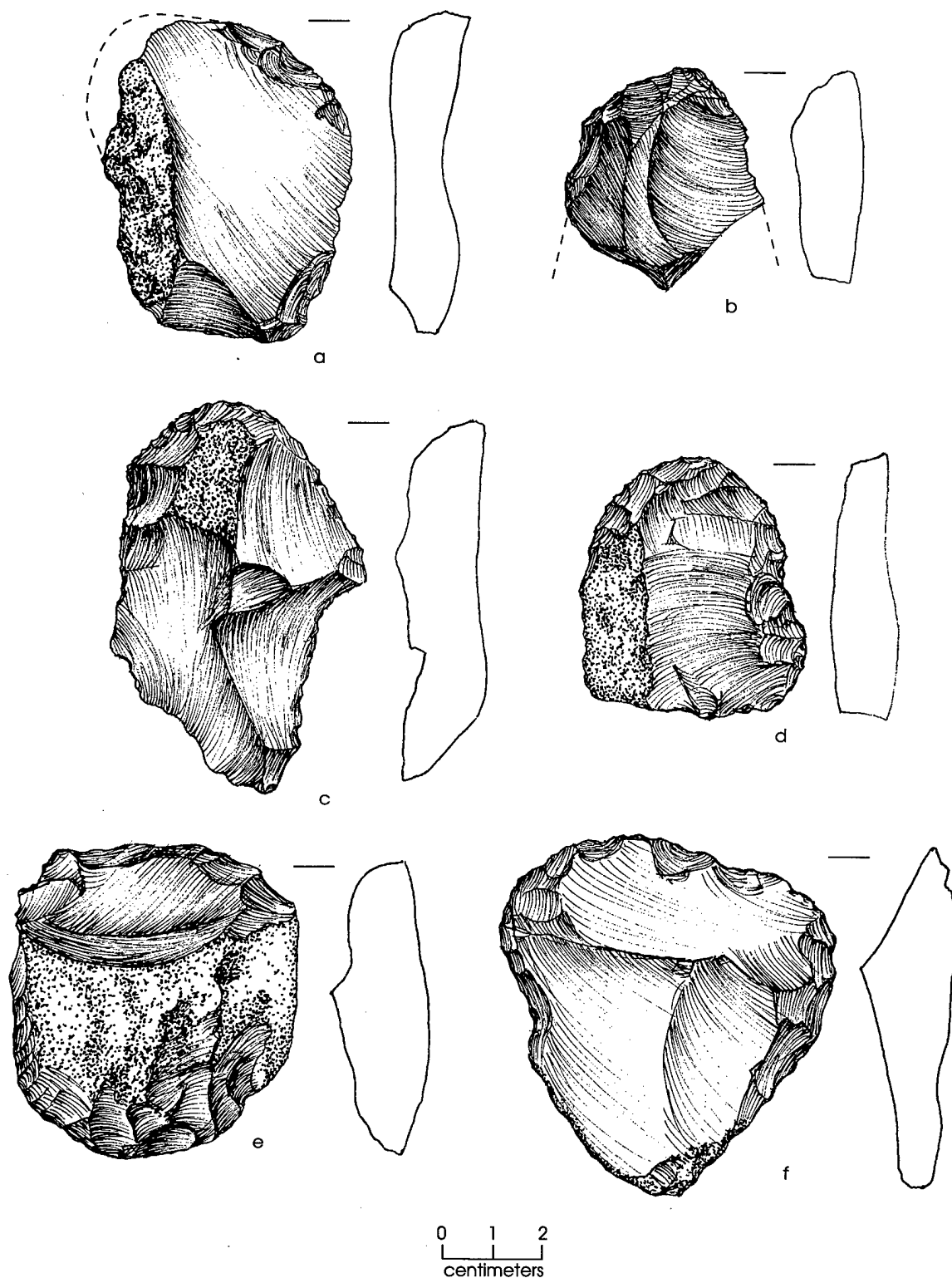
Twenty-seven chert cores were found. Nine (33.3 percent) of these are well worked and have no cortex remaining. Eleven (40.7 percent) specimens represent used cores but have from 1 to 50 percent of their surfaces covered with cortex. The other seven (26.0 percent) specimens probably represent tested cobbles and have from 50 to 99 percent of their surfaces covered with cortex.

#### Unmodified Debitage

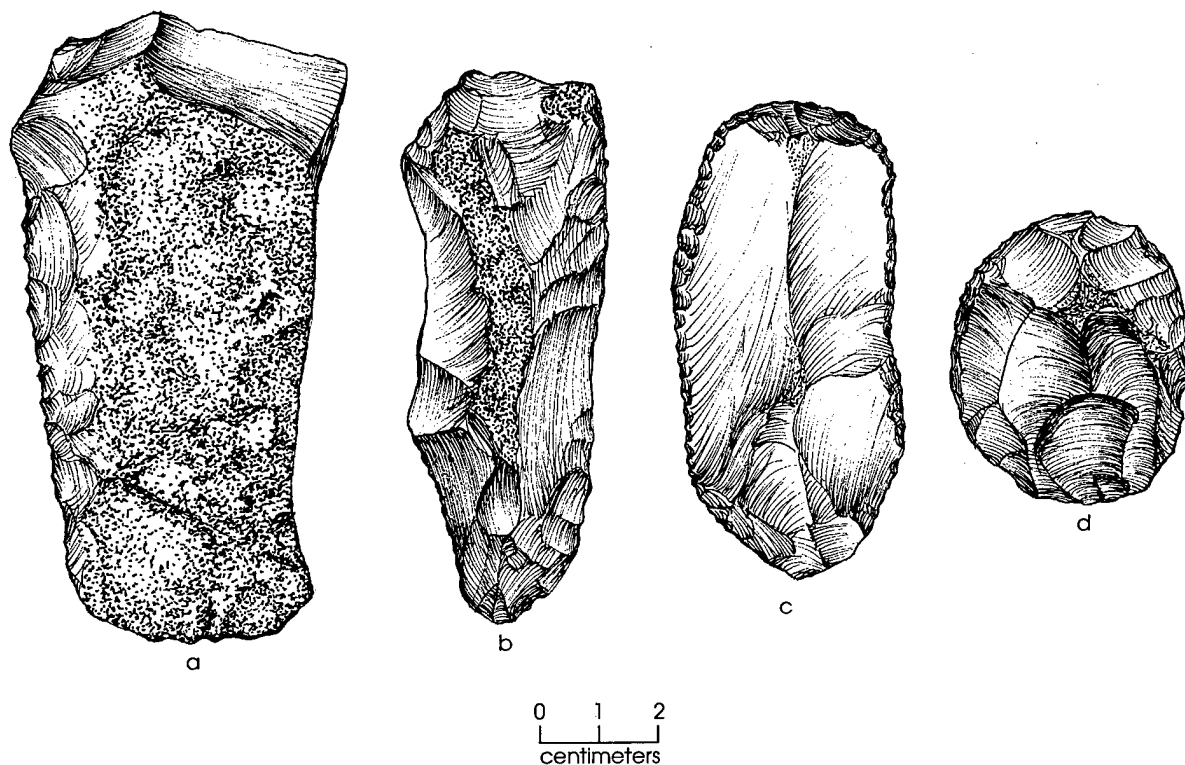
The most common artifact type recovered from almost all sites is unmodified debitage. A total of 13,461 pieces of debitage were recovered; 4,667 are complete, 5,195 are proximal fragments, 3,524 are chips, and 72 are chunks (excludes 2 flakes that were not coded). Broken down by amount of dorsal cortex, 181 specimens are primary flakes, 1,275 are secondary, and 12,002 are tertiary (excludes 2 flakes that were not coded) (Table 63). When categorized by size, 98 percent of all flakes are less than 1 inch (25.4 mm) in maximum length (Table 64).

#### GROUND AND BATTERED STONE ARTIFACTS

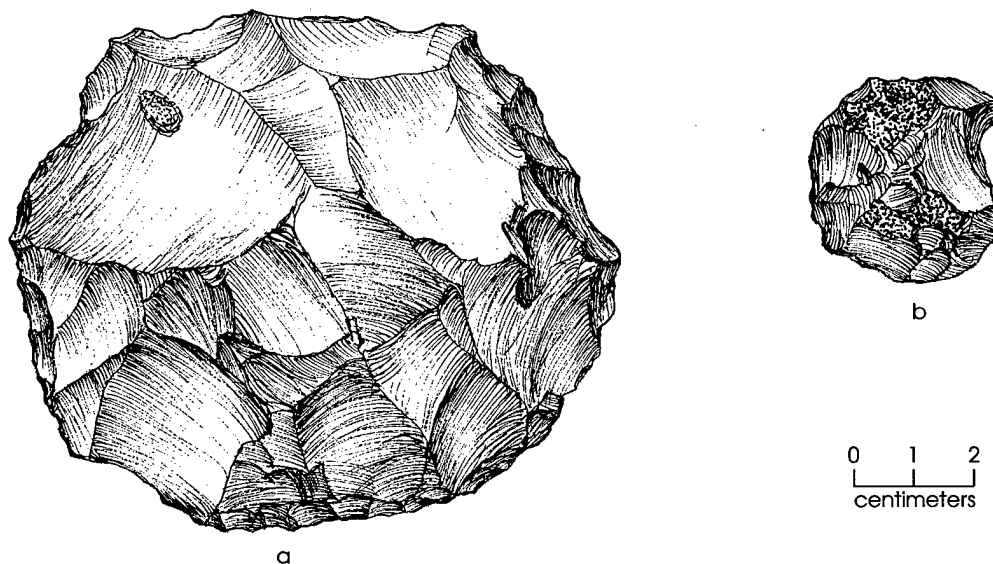
The 28 ground and/or battered stone artifacts recovered consist of manos, metates, indeterminate ground stone fragments, mano/hammerstones, hammerstones, and other ground stones (Table 65). All of these, except the 6 other ground stones, are considered to be grinding and/or battering tools. All 4 manos and all 9 metates are fragmentary specimens. Only 5 complete



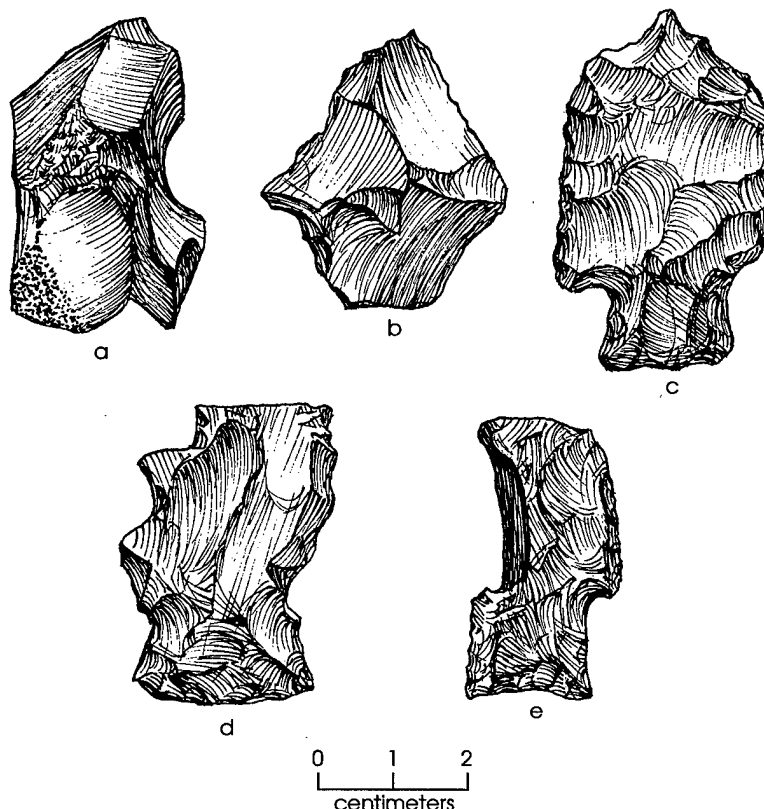
**Figure 141.** Unifacial scrapers from 41CV1286. (a-b) End scrapers; (c-f) end/side scrapers.



**Figure 142.** Unifacial scrapers. (a) Side scraper, 41CV1235; (b) side scraper, 41CV1133; (c) end/side scraper, 41CV1235; (d) end/side scraper, 41CV1269.



**Figure 143.** Other scrapers from (a) 41CV1049 and (b) 41CV1050.



**Figure 144.** Spokeshave, graters, and burins. (a) Spokeshave, 41CV1049; (b) flake graver, 41CV1269; (c) graver made on a Lange dart point, 41CV1275; (d) burin made on a Castroville dart point fragment, 41CV1093; (e) burin made on a Zephyr dart point fragment, 41CV984.

grinding/hammering tools were recovered (Figure 146, Table 66).

Twelve limestone metate fragments and one quartzite mano/hammerstone fragment have been heated, indicating that they were probably recycled after being broken. This is particularly true of the sites where ground stone tools were most common. For example, almost all of the limestone mano, metate, and indeterminate ground stone fragments from 41CV1133, 41CV1191, and 41CV1235 are burned, and many are directly associated with burned rock features. This leaves little doubt that the fragments were reused as hearthstones.

The grinding tools are predominantly made of limestone (two manos, nine metates, two indeterminate fragments, and two mano/hammerstones), while quartzite was only used for manos ( $n = 2$ ) and mano/hammerstones ( $n = 1$ ). Chert was used only for mano/hammerstones and manos (one each). Chert types represented are

Type 3, Anderson Mountain Gray; Type 4, Seven Mile Mountain Novaculite; and Type 34, indeterminate light brown. Notably, Seven Mile Mountain Novaculite is one of the densest, most grainy, and hardest cherts that occurs on Fort Hood; stream-rolled nodules are particularly well suited for use as hammerstones. Quartzite cobbles are available locally in the form of lag gravels on upland surfaces, but they are rare.

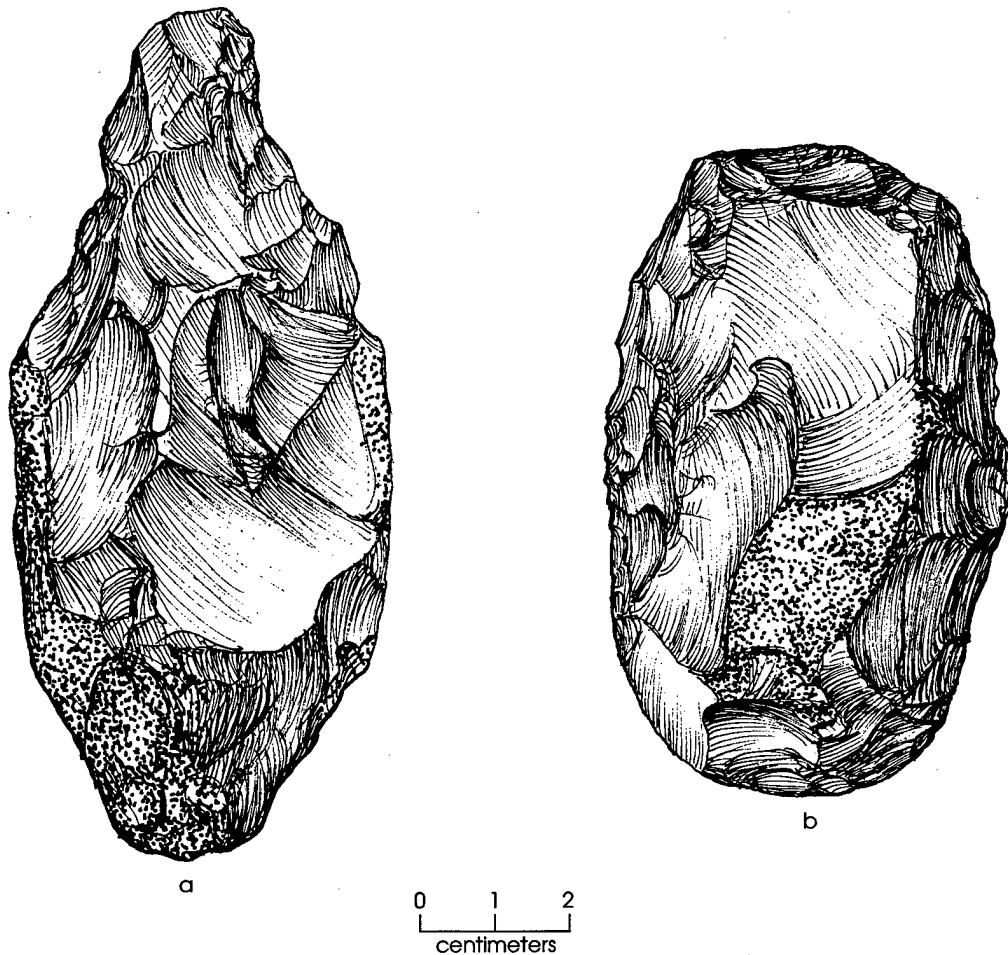
Five of the six specimens classified as other ground stone artifacts are pieces of hematite that exhibit striations and faceted edges. They were presumably ground to obtain red powder for making pigment or paint. One rectangular-shaped specimen is particularly unusual, being ground smooth on all sides (Figure 147). The sixth specimen is a tabular, stream-rolled limestone cobble (196x96x45 mm) with remnants of red powdered pigment on one face (Figure 148). It probably functioned as a paint palette. The red pigment is presumably hematite, but no

tests were done to confirm this.

## BURNED ROCKS

A total of 7,593 kg of burned limestone rocks were encountered in test units from all 42 tested sites (see Table 66). Burned rocks encountered in test units were quantified in the field and discarded. As a general rule, they were counted and weighed by levels. When found in feature contexts, however, burned rocks were sorted into size categories, counted, and weighed (see Chapter 4). No attempt was made to quantify burned rocks exposed on the surface, but the presence of exposed burned rocks, especially if associated with features, was noted.

All observed burned rocks were limestones, always seeming to match the locally available surface limestone materials. The majority of burned rocks (6,599 kg; 86.9 percent) observed in test units were associated with features (e.g.,



**Figure 145.** Cobble and core tools. (a) Cobble tool, 41CV957; (b) core tool, 41CV1093.

hearths and burned rock middens). Isolated specimens or small nonfeature clusters of burned rocks may only represent materials scattered on a living surface, but their presence in some contexts was an indication that burned rock features were also probably present.

All nonlimestone burned rocks were collected in the field and classified as heat shatter or spalls during analysis; they were subsequently discarded after being quantified. All of these specimens, which are not included in the burned rock counts given above, are fire-fractured or heat-spalled chert (no other materials were observed) but are otherwise unmodified. They were often associated with burned rock features where lithic debitage was abundant, and probably represent chert cobbles and debris that were accidentally burned.

When encountered in isolated test units, they provide little in the way of meaningful cultural interpretations. The effect of range fires (in the northwestern portion of Fort Hood in the spring of 1996) on the extensive chert outcrops along Henson Creek shows that archeologists must look closely at the archeological contexts of such specimens and be cautious before interpreting how or why they were burned.

## FAUNAL REMAINS

### Modified Mussel Shells

All mussel shell valves and fragments with umbos present were collected and examined for completeness, evidence of thermal alteration, and evidence of cultural modification. In the field,

Table 62. Summary of multifunctional tools

Site	Analysis Unit	Edge-modified Flake/Graver	Edge-modified Flake/ Spokeshave	Graver/ Miscellaneous Biface	Graver/ Miscellaneous Uniface	Graver/ Side Scraper	Graver/ Spokeshave	Hammerstone/ Side Scraper	Miscellaneous Uniface/ Spokeshave	Totals
41CV578	3	-	-	-	-	-	1	-	-	1
41CV1049	1	-	-	-	1	-	-	-	-	1
41CV1092	1	-	-	-	-	-	1	-	-	1
41CV1122	1	-	-	-	-	1	-	-	1	2
41CV1138	1	-	-	-	-	-	-	-	1	1
41CV1152	1	-	-	-	1	-	1	-	-	2
41CV1191	1	-	-	-	1	-	-	-	-	1
41CV1235	2	1	1	-	-	-	1	-	-	3
41CV1250	1	-	-	-	-	-	-	-	1	1
41CV1269	1	-	-	-	-	-	-	1	-	1
	3	1	-	-	-	-	-	-	-	1
41CV1275	1	-	-	-	-	-	-	-	1	1
	4	2	-	-	1	-	-	-	2	5
41CV1283	1	-	-	1	-	-	-	-	-	1
41CV1286	1	1	-	-	-	-	-	-	1	2
	2	-	-	-	-	-	-	-	1	1
41CV1308	1	1	-	-	-	-	-	-	-	1
Totals		6	1	1	4	1	4	1	8	26

mussel shell fragments lacking umbos were examined for cultural modification and discarded if no modifications were observed. Of the 194 mussel shells collected from 12 prehistoric sites, 7 specimens (3.6 percent) are complete, 12 (6.2 percent) are thermally altered, and 6 (3.1 percent) exhibit cultural modifications (Table 67). None of the complete specimens are burned or modified. Although discoloration may indicate intentional heating to open the shells to retrieve the mussels, shells may also be burned due to accidental heating (e.g., being discarded in or near fires).

All of the mussel shells belong to the family Unionidae, but no attempt to identify genus or species was made. At least nine different genera of mussels have been identified from Fort Hood archeological sites (Abbott and Trierweiler 1995a:Table 4.7). Because of their habitats, mussel shells are generally interpreted as having been culturally introduced into archeological contexts, but it is often unclear whether specimens observed in small testing samples were collected by prehistoric peoples for food or for their shells.

The six modified specimens consist of three that are perforated, two that have beveled straight edges shaped by cutting (apparently by the groove-and-snap method), and one that has a ground edge. Although the umbo is present on each specimen, they are all fragmentary and represent pieces of ornaments or waste by-products from the manufacture of ornaments or tools. Four of the modified shells are identifiable to genus: two are cf. *Lampsilis* sp. (one from 41CV578 and one from 41CV1250), one is *Quadrulapetrina* sp. (41CV1133), and one is cf. *Quadrula* sp. (41CV1133).

Three of these artifacts were found within a Late Prehistoric occupation zone (Feature 4) from 50–80 cm in Test Unit 1 at 41CV1250. Each of these is an anterior section of a right valve. One specimen (48x43x3 mm) has a 3x2-mm perforation drilled through the dorsal-central part of the shell from the interior. The second specimen (34x22x2.5 mm) exhibits a beveled, linear cut mark (cut from the interior) along the ventral edge from anterior to posterior. The third specimen (36x26x3 mm) was cut along the central portion of the shell from front to back

Table 63. Summary of unmodified debitage by amount of dorsal cortex remaining

		Amount of Cortex					Total Specimens
Site	Analysis Unit	Not Recorded	0 %	1-50 %	50-99 %	100 %	
41BL340	1		10	1	2	1	14
41CV578	1	-	54	11	1	1	67
	2	-	44	10	2	1	57
	3	-	174	15	2	2	194
41CV755	1	1	40	7	3	2	52
41CV947	1	-	124	11	5	-	140
41CV957	1	-	299	23	11	8	341
41CV984	1	-	334	39	18	10	401
41CV988	1	-	469	35	16	7	527
41CV1012	1	-	13	3	1	-	17
41CV1030	1	-	18	2	-	-	20
41CV1043	1	-	53	3	2	-	58
41CV1048	1	-	10	1	1	1	13
41CV1049	1	-	79	10	5	3	97
41CV1050	1	-	18	7	2	-	27
41CV1092	1	-	115	11	4	3	133
41CV1093	1	-	215	18	9	-	242
41CV1106	1	-	23	5	1	1	30
41CV1120	1	-	201	32	5	3	241
41CV1122	1	-	591	76	8	7	682
	2	-	151	9	5	1	166
	1	-	9	1	-	-	10
41CV1133	1	-	313	20	5	6	344
41CV1137	1	-	1	1	-	-	2
41CV1138	1	-	110	9	1	4	124
41CV1143	1	-	1	-	1	-	2
41CV1152	1	-	112	20	7	1	140
	2	-	2	5	-	-	7
41CV1191	1	-	891	68	20	8	987
	2	-	121	20	4	3	148
	3	-	-	2	-	-	2
41CV1194	1	-	9	1	1	1	12
	2	-	1	-	-	-	1
41CV1206	1	-	14	5	-	-	19
41CV1211	1	-	75	19	4	3	101
	2	-	1	1	-	-	2
41CV1219	1	-	21	5	3	5	34
41CV1221	2	-	631	43	16	13	703
41CV1222	1	-	6	-	-	-	6
	2	-	41	2	1	1	45
41CV1225	1	-	65	4	1	1	71
41CV1235	1	-	1,184	60	15	11	1,271
	2	1	593	67	23	9	692
41CV1250	1	-	176	28	15	9	228
	2	-	29	5	5	2	41
41CV1258	1	-	7	2	-	-	9
41CV1269	1	-	72	3	4	2	81
	2	-	806	38	26	11	881
	3	-	1,039	50	21	6	1,116
41CV1275	1	-	11	2	2	-	15
	2	-	2	-	-	-	2
	3	-	53	3	3	-	59
	4	-	2,033	104	49	33	2,219



Table 63, continued

		Amount of Cortex					Total Specimens
Site	Analysis Unit	Not Recorded	0 %	1-50 %	50-99 %	100 %	
41CV1282	1	—	2	1	—	—	3
41CV1283	1	—	117	6	—	1	124
41CV1286	1	—	364	6	—	—	370
	2	—	31	10	—	—	41
41CV1287	1	—	4	—	—	—	4
	1	—	2	—	—	—	2
	1	—	10	3	—	—	13
41CV1308	1	—	8	1	1	—	10
Totals		2	12,002	944	331	181	13,460
Percents		<1	89.2	7.0	2.5	1.3	100.0

(ventral to dorsal). This edge is ground smooth, thus erasing any evidence of the cut mark. There are no striations indicating that this may have been a scraping tool, and it probably represents some type of ornament.

Two other modified shells, both posterior fragments of right valves, were found in a burned rock midden (Feature 1) at 41CV1133. One specimen (30x27x3.5 mm) was recovered from 40–50 cm in Test Unit 3. It is broken along the approximate midpoint of a perforation located just in front of the hinge teeth. The hole was approximately 9 mm in diameter and was drilled from the exterior surface. The second specimen (45x30x3.5 mm) was recovered from 70–80 cm in Test Unit 1. It was cut from the interior along a plane from the dorsal to ventral edge.

The sixth modified shell was found at 70–80 cm in Test Unit 2 at 41CV578. The remaining section (39.0x35.0x2.5 mm) of this artifact is a posterior fragment of a right valve fractured across a perforation that was approximately 3.5 mm in diameter. The hole is centrally located on the shell and was drilled from the exterior surface.

### Snail Shells

The most visible and ubiquitous species of land snail that occurs throughout the Holocene deposits at Fort Hood is *Rabdotus*. Although they occur naturally and rarely are modified, *Rabdotus* shells have been shown to have considerable research potential for interpreting the integrity and chronology of archeological deposits (e.g., Ellis and Goodfriend 1994; Ellis et al.

1996). No modified specimens were encountered during the 1996 testing project, and no attempt was made to quantify all of the snail shells that were found. A sample was collected from each general excavation level and feature where they were encountered, but no meaningful cultural interpretations can be derived based simply on their occurrence. No special analyses were conducted on snails except for two specimens recovered from 41CV1275; these were submitted for amino acid epimerization analysis. One of these was subsequently submitted for AMS radiocarbon analysis (see Appendix A).

### Bones

All vertebrate faunal remains discovered in test units were collected. Because animal bones may occur in archeological sites as a result of natural and/or cultural processes, their archeological contexts must be examined on a case by case basis to infer their cultural significance. Animal bones were recovered from 12 of the 42 sites (28.6 percent) (Table 68). However, no specimens could be classified as bone tools or ornaments since none exhibited intentional cultural modification. The faunal remains recovered from the NRHP-eligible sites were analyzed and are described in more detail in Appendix D. A total of 1,008 specimens from 14 analysis units at nine sites were examined, and eight species or taxa were identified. Two hundred and sixty-eight of the 1,000 specimens (26.6 percent) exhibit spiral fractures, while 210 (20.8 percent) exhibit evidence of burning.

The few vertebrate remains recovered from

Table 64. Summary of unmodified debitage by size

Site	Analysis Unit	Unclassified	Size Categories (inches)* (metric equivalents in mm)						Total
			<0.25 (<6.4)	0.25-0.5 (6.4-12.7)	0.5-1.0 (12.7-25.4)	1.0-1.5 (25.4-38.1)	1.5-2.0 (38.1-50.8)	>2.0 (>50.8)	
41BL340	1	-	1	8	3	2	-	-	14
41CV578	1	-	4	47	15	1	-	-	67
41CV578	2	-	3	30	22	2	-	-	57
41CV578	3	-	-	137	55	1	1	-	194
41CV755	1	-	3	41	7	1	-	-	52
41CV947	1	-	10	106	24	-	-	-	140
41CV957	1	-	53	198	83	7	-	-	341
41CV984	1	1	63	250	84	3	-	-	401
41CV988	1	-	126	343	56	2	-	-	527
41CV1012	1	-	-	8	9	-	-	-	17
41CV1030	1	-	3	17	-	-	-	-	20
41CV1043	1	-	-	45	13	-	-	-	58
41CV1048	1	-	-	10	2	1	-	-	13
41CV1049	1	-	4	69	23	1	-	-	97
41CV1050	1	-	-	19	8	-	-	-	27
41CV1092	1	-	5	85	39	4	-	-	133
41CV1093	1	-	18	157	64	3	-	-	242
41CV1106	1	-	-	19	10	1	-	-	30
41CV1120	1	-	13	175	47	5	1	-	241
41CV1122	1	-	54	478	135	13	2	-	682
41CV1122	2	-	8	115	39	4	-	-	166
41CV1122	1	1	-	6	3	-	-	-	10
41CV1133	1	-	18	237	84	4	1	-	344
41CV1137	1	-	-	1	1	-	-	-	2
41CV1138	1	-	10	81	32	1	-	-	124
41CV1143	1	-	-	2	-	-	-	-	2
41CV1152	1	-	-	68	69	3	-	-	140
41CV1152	2	-	-	3	4	-	-	-	7
41CV1191	1	-	99	747	135	6	-	-	987
41CV1191	2	-	1	109	36	2	-	-	148
41CV1191	3	-	1	-	1	-	-	-	2
41CV1194	1	-	-	8	4	-	-	-	12
41CV1194	2	-	-	-	1	-	-	-	1
41CV1206	1	-	-	13	5	1	-	-	19
41CV1211	1	-	2	77	20	2	-	-	101
41CV1211	2	-	-	-	2	-	-	-	2
41CV1219	1	-	1	24	9	-	-	-	34
41CV1221	2	-	62	536	100	5	-	-	703
41CV1222	1	-	1	3	2	-	-	-	6
41CV1222	2	-	6	36	3	-	-	-	45
41CV1225	1	-	7	50	14	-	-	-	71
41CV1235	1	1	284	706	258	22	-	-	1,271
41CV1235	2	-	47	337	236	62	9	1	692
41CV1250	1	-	20	157	46	5	-	-	228
41CV1250	2	-	4	22	11	4	-	-	41

Table 64, continued

Site	Analysis Unit	Unclassified	Size Categories (inches)* (metric equivalents in mm)						Total
			<0.25 (<6.4)	0.25-0.5 (6.4-12.7)	0.5-1.0 (12.7-25.4)	1.0-1.5 (25.4-38.1)	1.5-2.0 (38.1-50.8)	>2.0 (>50.8)	
41CV1275	2	-	-	2	-	-	-	-	2
41CV1275	3	-	6	37	16	-	-	-	59
41CV1275	4	-	358	1,456	386	19	-	-	2,219
41CV1282	1	-	-	2	1	-	-	-	3
41CV1283	1	-	14	92	18	-	-	-	124
41CV1286	1	-	71	237	60	1	1	-	370
41CV1286	2	-	2	23	15	-	-	1	41
41CV1287	1	-	-	2	2	-	-	-	4
41CV1287	1	-	-	2	-	-	-	-	2
41CV1287	1	-	-	9	3	1	-	-	13
41CV1308	1	-	4	3	3	-	-	-	10
Totals		3	1713	8,752	2,759	211	19	3	13,460
Percents		<0.1	12.7	65.0	20.5	1.6	0.1	<0.1	100.0

\*Size categories in inches correspond to standard sieve sizes.

the ineligible sites (n = 11, 1.1 percent) were analyzed in-house to obtain basic data on frequencies and general types. Although species identification was not attempted for these bones, they are quantified by size within four broad categories, as follows: large (cow/bison sized), medium (deer to jackrabbit sized), small (cottontail rabbit and smaller), and indeterminate. Attributes analyzed for these remains are limited to completeness (i.e., complete bones vs. fragments), element identification, and modification. Only three specimens exhibit evidence of burning, and two exhibit cut marks.

#### MACROBOTANICAL REMAINS

Charred plant remains were recovered from charcoal and flotation samples collected from feature and nonfeature sediments. Of the 93

charcoal samples collected and 140 flotation samples collected and processed, only 9 charcoal (including 1 charcoal sample pulled from a flotation sample) and 49 flotation samples were submitted to the Paleoethnobotanical Laboratory at Texas A&M University for macrobotanical analysis (see Appendix E). The most important conclusion of the macrobotanical analyses was that a moderate potential exists for recovering charred plant remains of economic interest (i.e., representing food resources as opposed to fuel) in the House Creek area and in certain situations in Paluxy environments. Abundant and/or identifiable materials were recovered from several sites (41CV578, 41CV1235, 41CV1250, and 41CV1269) located along House Creek and from a well-preserved feature discovered in the Paluxy sediments at 41CV988.

**Table 65. Summary of ground and battered stone artifacts**

Site, Analysis Unit (AU)	Mano	Metate	Indeterminate Fragment	Mano/ Hammerstone	Hammerstone	Other Ground Stone	Totals
41CV988 (AU 1)	-	-	-	1 quartzite*	-	-	1
41CV1043 (AU 1)	-	-	-	-	-	1 limestone**	1
41CV1092 (AU 1)	-	-	-	1 limestone	-	-	1
41CV1093 (AU 1)	-	-	1 limestone*	-	-	1 hematite	2
41CV1122 (AU 1)	1 quartzite	3 limestone*	-	-	-	1 hematite	1
41CV1133 (AU 1)	2 limestone (*on 1)	3 limestone*	-	-	-	-	4
41CV1191 (AU 1)	-	1 limestone*	-	-	-	-	5
41CV1191 (AU 2)	-	1 limestone*	1 limestone*	1 chert	1 quartzite	-	-
41CV1235 (AU 1)	-	-	-	-	2 chert	-	5
41CV1235 (AU 2)	-	-	-	1 limestone	-	1 hematite	2
41CV1250 (AU 1)	-	-	-	-	-	-	1
41CV1269 (AU 2)	1 quartzite	-	-	-	-	1 hematite	2
41CV1269 (AU 3)	-	1 limestone*	-	-	-	-	1
41CV1287 (AU 1)	-	-	-	-	-	1 hematite	1
Totals	4	9	2	4	3	5	28

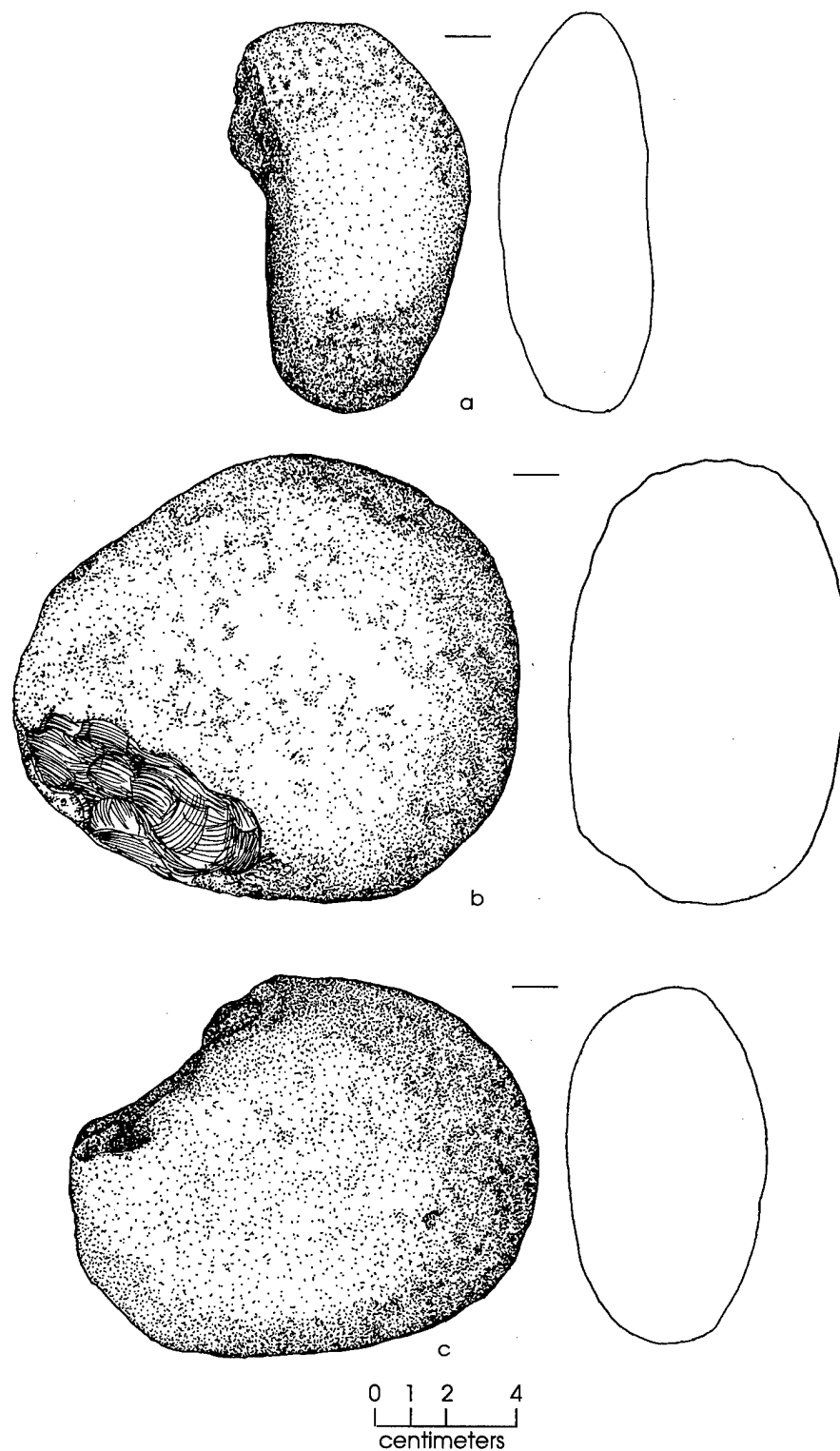
\* Evidence of heating observed on specimens; 12 limestone fragments (mano, metate, and indeterminate) and 1 quartzite mano/hammerstone are heated.

\*\* Probable hematite paint palette.

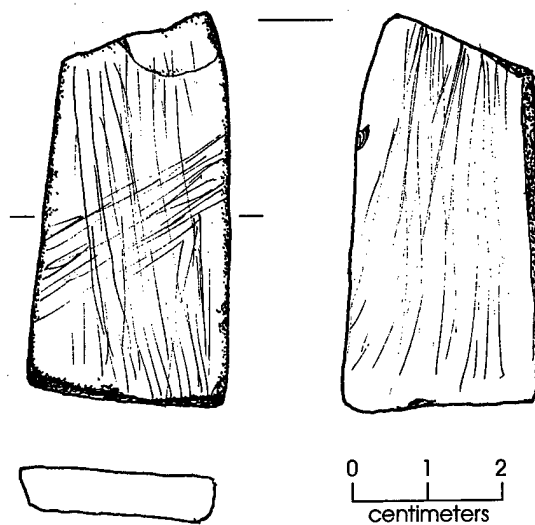
**Table 66. Summary of attributes and measurements of complete and nearly complete manos, mano/hammerstones, and hammerstones**

Site, Analysis Unit (AU)	Tool Type	Material	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
41CV988 (AU 1)	mano/hammerstone	quartzite	92.5	57.7	39.1	286
41CV1092 (AU 1)	mano/hammerstone*	limestone	115.1	93.0	53.5	879
41CV1235 (AU 1)	hammerstone	quartzite	86.5	51.6	39.9	233
41CV1235 (AU 1)	mano/hammerstone*	chert (Type 4)	124.9	112.2	66.7	1,416
41CV1269 (AU 2)	mano/hammerstone	limestone	109.5	105.8	64.6	1,124

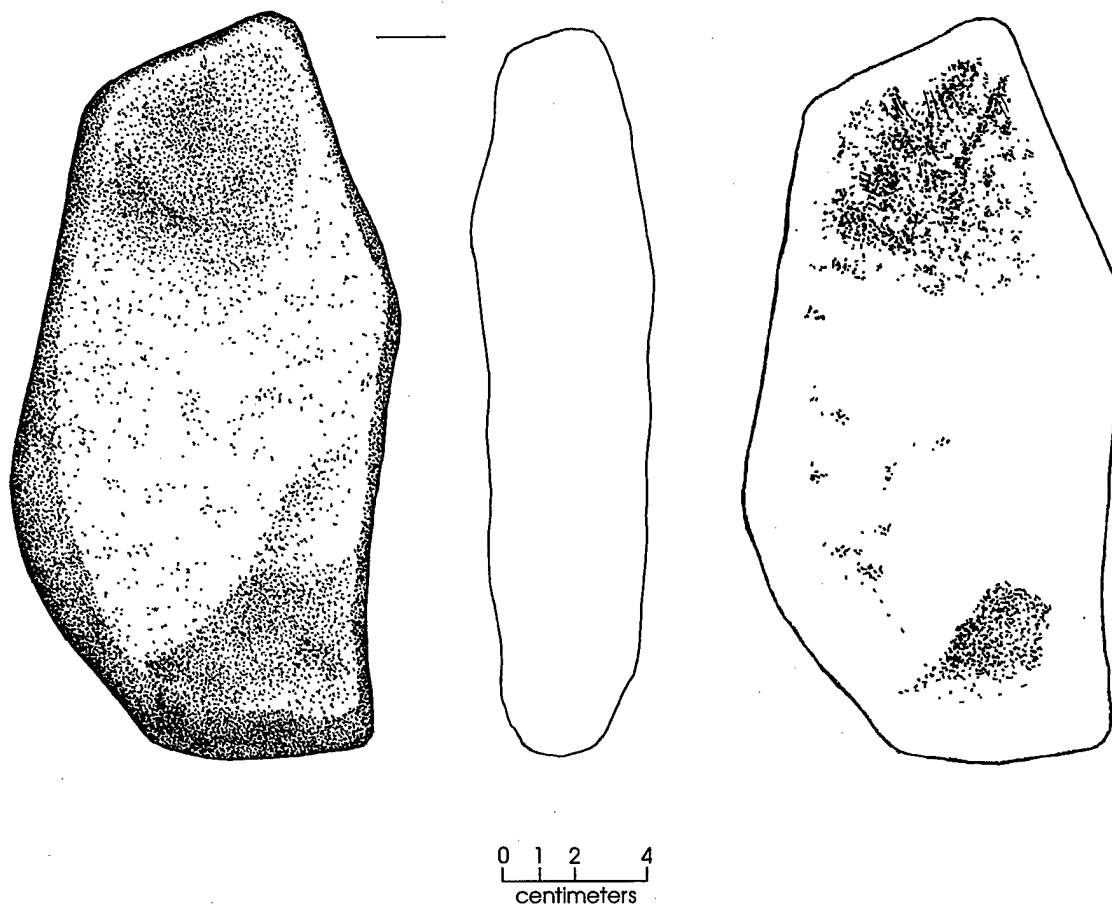
\*Exhibits bifacial grinding



**Figure 146.** Ground and battered stone artifacts. (a) Quartzite mano/hammerstone, 41CV988; (b) chert mano/hammerstone, 41CV1235; (c) quartzite hammerstone, 41CV1092.



**Figure 147.** Ground and faceted hematite stone, 41CV1269.



**Figure 148.** Tabular limestone cobble used as a paint palette, 41CV1043. View on left shows the rock's surface undulations; view on right shows pigment concentrations.

**Table 67. Summary of mussel shells by analysis unit\***

Site	Analysis Unit	Total Mussel Shells	Complete Valves	Burned Shells	Modified Shells
41CV578	2	3	—	—	—
	3	19	—	—	1
41CV947	1	3	—	2	—
41CV1030	1	1	—	—	—
41CV1120	1	29	1	3	—
41CV1122	1	41	1	1	—
	2	28	1	1	—
41CV1133	1	39	2	3	2
41CV1191	1	1	1	—	—
41CV1206	1	5	—	—	—
41CV1235	2	7	—	—	—
41CV1250	1	14	—	2	3
	2	1	—	—	—
41CV1269	2	1	1	—	—
41CV1269	3	1	—	—	—
41CV1308	1	1	—	—	—
Totals		194	7	12	6

\* Only whole valves and fragments with umbos were collected; total includes six modified shell artifacts.

**Table 68. Summary of vertebrate faunal remains recovered**

Site	Analysis Unit	Total Bones	Spirally Fractured Bones	Burned Bones
41CV578	2	5	—	—
41CV988	1	7	—	1
41CV1049	1	1	—	—
41CV1122	1	15	4	3
	2	100	7	9
41CV1133	1	2	1	—
41CV1191	1	9	—	—
41CV1211	1	5	—	2
41CV1219	1	2	—	1
41CV1221	1	4	—	—
41CV1235	1	318	85	61
	2	236	68	49
41CV1250	1	44	14	4
	2	17	10	—
41CV1269	1	8	7	1
	2	163	58	49
	3	83	14	33
Totals		1,019	268	213

# FORT HOOD CHERT TYPOLOGY: ANALYSIS OF HOUSE CREEK CHERT SAMPLES AND REPLICABILITY TESTS

*Douglas K. Boyd*

11

During the 1996 field season, samples of chert were collected from five localities in three different topographic/geomorphic settings along House Creek. The chert sample settings include river channel gravel bars and alluvial terrace gravel exposures along House Creek, lag gravels on a Pleistocene T<sub>2</sub> terrace, and lag gravels on the upland Killeen surface. All of the samples are of naturally occurring, unmodified chert cobbles; some are from nonarcheological contexts (e.g., river channel gravels), while others are from chert outcrops on known archeological sites. For convenience, however, all of the samples are assigned site numbers; they were all collected on or adjacent to prehistoric sites 41CV1222, 41CV1250 (two localities), 41CV1275, or 41CV1286. Each sample was obtained by walking the sample area for 20–30 minutes, breaking rocks to find chert nodules, and collecting one to three nodules of each distinctive kind of chert (i.e., materials that were homogeneous in color, texture, inclusions, etc.) that was found. All collected specimens are cobbles, which according to the Wentworth scale are 64 to 256 mm in maximum size. Back in the laboratory, a large, high-quality flake from each nodule (i.e., a flake representative of the chert inside the cobble) was subjected to typological analysis by comparison with the Fort Hood chert typology (summarized in Table 6; see Appendix F).

The sample localities discussed in this section are shown in Figure 149 and summarized in Table 69. The samples are spread over 5 km along House Creek. Previous work by Mariah Associates defined the distribution of chert outcrops along House Creek, designated many of the localities as Lithic Resource Procurement Areas (LRPAs), and collected samples of the cherts for curation (Frederick and Ringstaff

1994). The chert outcrops along House Creek were characterized as follows:

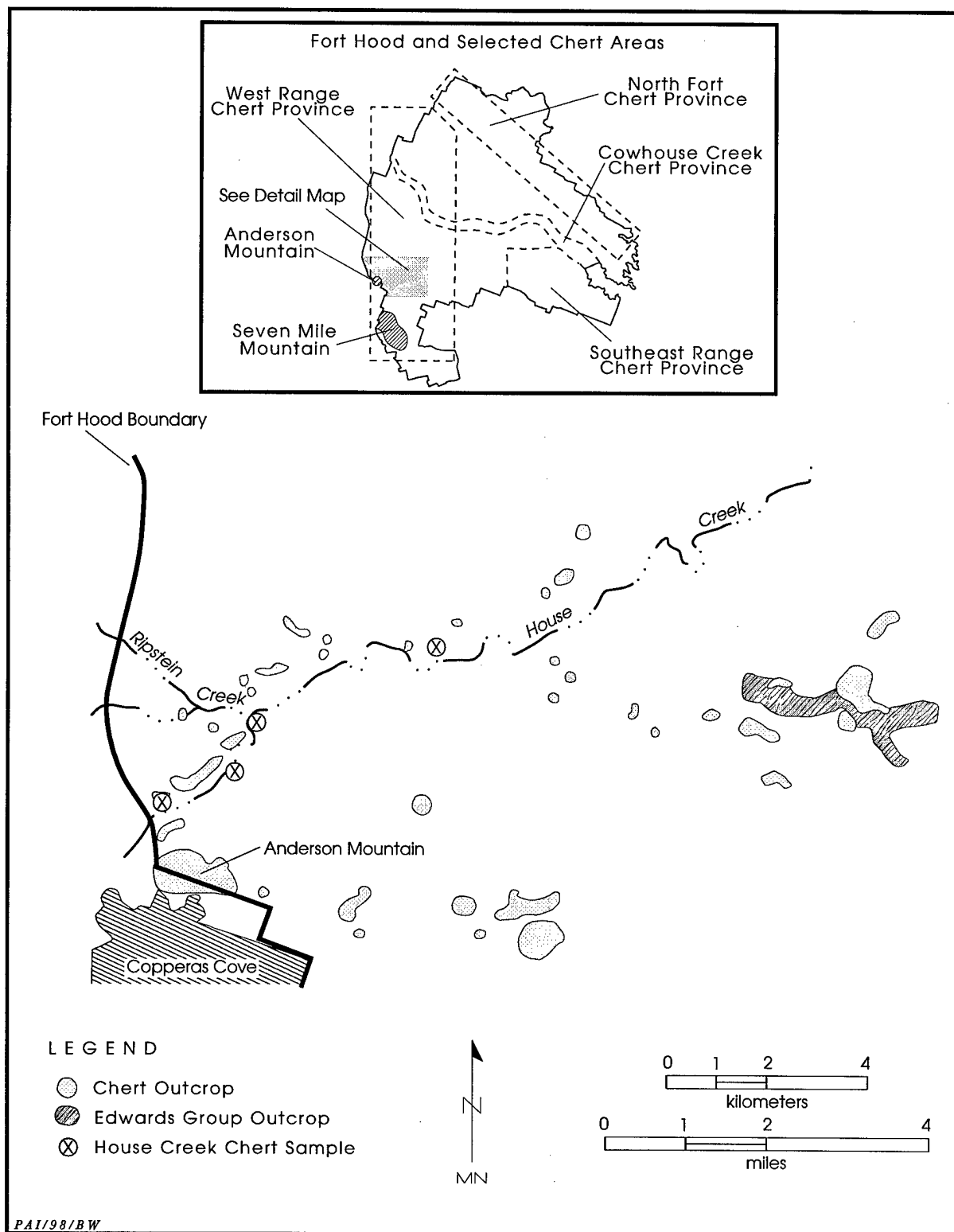
The number of small chert outcrops depicted adjacent to House Creek [see Figure 149], for instance, were field checked and found to be diffuse scatters of secondary chert cropping out on the margins of the incised House Creek valley. These lag gravels contain two types of chert that occur on Anderson Mountain and Seven Mile Mountain in the southwestern part of Fort Hood [Frederick and Ringstaff 1994:140].

The two common chert types in these samples were Anderson Mountain Gray (Type 3) and Seven Mile Mountain Novaculite (Type 4), both of which occur in primary contexts 3 to 8 km south of House Creek. Frederick and Ringstaff (1994:140) observed that these two types are the common component of the upland lag gravels along House Creek, but they also acknowledged the possible existence of a chert zone somewhere in the area dissected by House Creek (perhaps in the Glen Rose Formation or in some unrecognized remnant of Edwards Group limestones). Although this question cannot currently be resolved, the sparse samples analyzed here are a first attempt at more systematically defining the chert types present along House Creek, a generally chert poor portion of the West Range.

## SAMPLE 41CV1275 ANALYSIS AND FIRST REPLICABILITY TEST

The first House Creek chert sample was of upland lag gravel cherts collected from 41CV1275





**Figure 149.** Map of Fort Hood showing locations of the House Creek chert sample localities in relation to known chert outcrops (excluding channel gravels) defined by Frederick and Ringstaff (1994:Figure 6.6).

**Table 69. Summary of House Creek chert samples**

Site/Sample Number	Location	Sample and Locality Description
41CV1222	Training Area 33, north of House Creek	Channel and terrace gravels
41CV1250, Sample 1	Training Area 34, north of House Creek	Channel and terrace gravels
41CV1250, Sample 2	Training Area 34, north of House Creek	Lag gravels on Pleistocene T <sub>2</sub> terrace
41CV1275	Training Area 33, north of House Creek	Lag gravels on upland Killeen surface
41CV1286	Training Area 33, south of House Creek	Channel and terrace gravels

while the site was being tested in October 1996. Site 41CV1275 is located near the head of House Creek and just north of Anderson Mountain in the southwestern corner of the base (excluding West Fort Hood). The sample area is located in the western end of the site and was identified as "Chert Zone 1" by previous investigators (see Trierweiler, ed. 1994:Figure 41CV1275.1).

The 12 chert cobbles in this sample represent residual gravels that occur naturally on the upland Killeen surface across some parts of the West Range, albeit in relatively low quantities compared to other chert sources at Fort Hood. This sample was collected with two goals in mind. First, previous investigations had led researchers to suspect that some Southeast Range chert types might be present in the upland gravels along House Creek in the western portion of the post (Abbott and Tomka 1995:679–680; Mehalchick et al. 1999:400–409). The 41CV1275 sample was collected specifically to test this hypothesis. The second goal of this analysis was to better define the degree of replicability and the rate of error inherent in a typological analysis of cherts from Fort Hood. The analysis of the 41CV1275 chert specimens was structured to serve as a replicability test of classifying chert specimens according to the Fort Hood chert typology. In order to accomplish both objectives, seven people were chosen to conduct independent typological analyses of the collected specimens. The analysts varied considerably in terms of their level of lithic analysis experience and knowledge of Fort Hood cherts. The most experienced analysts had a great deal of lithic technology knowledge and experience with Fort Hood cherts, while the least experienced analysts had very limited lithics knowledge and no familiarity with the Fort Hood chert typology. Other analysts had varying levels of experience with lithic analyses, but no familiarity with Fort Hood cherts. In this manner, it was possible to determine just how important lithic analysis

experience and an intimate familiarity with the Fort Hood chert typology were to the replicability of chert typology analysis.

The 41CV1275 sample consists of 12 flakes analyzed individually by each of the seven analysts. Each analyst was given a chert type list (the same as Table 6 except that Type 29 was a catchall for all indeterminate categories) and a coding sheet. The analysts typed the sample specimens by comparing the sample flakes with the flakes on the chert typology cards constructed by Mariah Associates (see Abbott and Trierweiler 1995b:Figure 4.9). Each analyst was allowed as much time as they felt necessary to type the chert flakes; all completed the task within 10 to 30 minutes. The analysts were instructed to use the indeterminate type for any specimen about which they were unsure. Although not instructed to do so, some analysts chose to record a "second guess" for certain specimens that closely resembled other chert types.

After the analysts recorded their data on separate coding sheets, all of the chert type assignments were compiled in a table. The numbers for each specimen were compared and scored using the following set of rules: (1) any chert type that received three first choice votes was considered a consensus type, and there could be two consensus types (meaning both are equally valid); (2) any nonconsensus chert type that received two first or second choice votes was considered a consensus second choice, thus representing a type that could easily be mistaken for the primary type or other second choice types; (3) when an analyst's first choice vote deviated from the consensus type, it was considered to be an error (votes of Type 29 [indeterminate] were never considered errors); and (4) in cases where no consensus type was identified (i.e., no chert type got three first choice votes), the consensus was considered to be unidentified and all votes other than Type 29 were considered to be errors. The results of this study are outlined in Table 70 where the analysts are

Table 70. Comparison of chert typology analyses, 41CV1275 sample

Specimen Number	Analyst							Consensus
	I	II	III	IV	V	VI	VII	
1	4	4	4	4	4	4	4	4
2	4	4	4	4	4	4	4	4
3	3 (10)	3 (10)	10	10	3	3	10	3, 10
4	3* (10)	3* (10)	10*	10* (5)	7*	18*	18*	none (3, 10, 18)
5	4	5*	4	4	4	4	14*	4
6	29	29	10*	29 (23)	29 (28)	29	29	29
7	3* (10)	10 (3)	10	10	10	10	10	10
8	3	3	3	3	7*	3	3	3
9	6	5*	6	6 (5)	6	28*	6	6 (5)
10	3*	29**	28	28	28	28	28	28
11	3	29**	3	3	3	3	28*	3
12	3* (10)	3* (10)	18*	10*	3*	29**	29** (24)	none (3, 10, 29)
Error Rate	4	4	3	2	3	2	3	2.9 (24 percent)

NOTE: Number in parentheses indicates the analyst's second choice.

\* Identification deviates from consensus score and is an error.

\*\* Identification deviates from consensus score but is not an error because Type 29 is indeterminate.

ranked in general order of experience, with the most experienced being Analyst I and the least experienced being Analyst VII.

It is impossible to know precisely what the true chert types for these specimens are; however, the consensus type represents the chert type to which most analysts, regardless of their experience, would probably assign a given flake. Chert type assignments that deviate from the consensus type are considered to be errors, and an individual error rate was figured by counting the number of errors attributed to each analyst. The average error rate was also calculated.

A number of observations and conclusions can be offered based on the chert typology analysis data in Table 70. A fair degree of consistency was obtained by all of the analysts, regardless of experience. Individual error rates ranged from 2 to 4. The average error rate of 2.9 indicates that 24 percent of the sample was difficult to classify with any degree of confidence.

Analysts generally agreed on the identification of Specimens 1, 2, and 5 as Type 4 chert (Seven Mile Mountain Novaculite) and Specimen 10 as Type 28. It also is interesting that most of the analysts conservatively typed Specimen 6 as indeterminate (Type 29). There is considerable difference of opinion about Specimens 3, 4, 7, and 12, which were commonly identified as chert Types 3 (Anderson Mountain Gray) and 10 (Heiner Lake Blue). After the study, all analysts

agreed that these two types are very similar, with the primary difference being that Type 10 is darker than Type 3. In addition, Types 5 (Texas Novaculite) and 6 (Heiner Lake Tan) are similar and were also confused during the analysis.

Perhaps the most important conclusion to be drawn from this analysis is that some cherts in this sample were identified by the majority of analysts as Southeast Range chert types. The consensus identifications include two specimens identified as Heiner Lake Blue (Specimens 3 and 7) and one specimen identified as Heiner Lake Tan (Specimen 9). These Southeast Range chert types were previously thought to be present primarily in the southeastern portion of Fort Hood (e.g., around Heiner Lake), although Frederick and Ringstaff (1994:148-152) acknowledged that their true areal extent is unknown. The recognition that some of these chert types are present in the residual gravels found on the Killeen surface in the southwestern portion of the base is significant.

## SECOND REPLICABILITY TEST

Based on the results of the first chert typology study, a second replicability test was devised. A sample of 20 typologically distinctive flakes was pulled from the original Fort Hood LRPA chert type locality collections made by Mariah Associates in 1991 and 1992. These specimens

represented 10 of the original 17 chert types defined by Frederick and Ringstaff (1994:Table 6.3) for Fort Hood and vicinity (including Owl Creek Black found off-post). The chert specimens and types represented in this analysis group are summarized in Table 71.

Six of the seven analysts who participated in the first chert typology test also completed the second test. Procedures were the same except that each analyst was instructed to record a second guess for specimens that they felt closely resembled some other chert type. The results of this analysis are summarized in Tables 72 and 73.

The second chert typology test was scored in two different ways. The first method assumed that the "known" chert types were correct and that any deviation from them was an error (see Table 72). Using this method, the rate or error for individual analysts ranged from 2 to 6. The average individual rate of error was 4.2, while the total number of errors for the consensus type identifications is 4. Thus, approximately 20–21 percent of the sample was misidentified, depending upon how the error rate is figured. This rate of error is comparable to the error rate derived from the 41CV1275 analysis. Looking at the error rates of the individual analysts, it appears that lithic analysis experience and knowledge of Fort Hood cherts are of little importance when comparing individual specimens to the chert typology collection. The error rates of the most experienced and least experienced analysts are nearly the same.

The second chert typology test data are revealing with respect to the chert types that were misidentified. Specimen 10 of Owl Creek Black (Type 17) was misidentified by the majority of analysts as Cowhouse Dark Gray (Type 19). These two types are not related genetically nor are they necessarily found in close proximity to each other. In contrast, while specimens of Fort Hood Gray (Type 14) and Gray-Green-Brown (Type 15) were commonly misidentified (see Specimens 14, 16, and 17), these chert types are genetically related and co-occur in the same areas (see Frederick and Ringstaff 1994:153).

The second method of calculating the error rate is to disregard the "known" types and assume that the consensus type represents the realistic view of how analysts would type the specimen. When the data are compared using this method, as described previously for sample 41CV1275, the changes are not dramatic but are revealing nonetheless (see Table 73). When the second replicability test data are compared by consensus scores, the error rates drop slightly (in comparison with the error rates derived from the known types). Individual error rates range from 2 to 5, and the average analyst error rate is 3.3 (16.7 percent). The obvious changes are as follows. Specimen 8 is typed as unidentified rather than as Heiner Lake Blue (Type 10). This identification seems more realistic since none of the analysts thought that specimen 8 was Heiner Lake Blue. Specimen 10 switches from

**Table 71. Summary of chert type localities represented in the second chert typology replicability test**

Type Number	Type Name	Type Site Location*	Number of Specimens
2	Cowhouse White	E38/N49	2
4	Seven Mile Mountain Novaculite	E7/N38	1
6	Heiner Lake Tan	E32/N45	3
8	Fort Hood Yellow	E25/N36 and E17/N67–68	2
9	Heiner Lake Translucent Brown	E32/N44	2
10	Heiner Lake Blue	E32/N45	3
13	East Range Flecked	E41/N48	1
14	Fort Hood Gray	E30/N60	2
15	Gray-Brown-Green	E31/N60	2
17	Owl Creek Black	E36/N60**	2

\* Type site location is the PK grid where the LRPA chert samples were taken (from Trierweiler, ed. 1994:Table 6.3)

\*\* This PK grid is located just north of Fort Hood.

**Table 72. Chert typology analysis data from second replicability test, compared by "known" types**

Specimen Number	Analysts							Known Chert Type
	II	III	IV	V	VI	VII	Consensus	
1	4	4	4	4	4	29** (4)	4	4
2	6	6	6	6	6	6	6	6
3	2	2	2	2	2	2	2	2
4	6*	18*	29** (7)	8	8	8	8	8
5	9 (10)	9	9	9	9	9	9	9
6	8	8	8	8	8	8	8	8
7	10	10	10	15*	10	10	10	10
8	29**	5*	3* (29)	23*	29** (3)	29**	29**	10
9	13	13	13	13	13	13	13	13
10	19*	19*	17 (19)	17	19*	16* (14)	19* (17)	17
11	6	6	6	6	28* (6)	6	6	6
12	14	14 (5)	14	14	14	14	14	14
13	29** (6)	6 (7)	6	6	6	6	6	6
14	15*	14	15* (14)	15*	14 (15)	15*	15* (14)	14
15	17	17	17	17	17	17	17	17
16	14*	14*	15	14*	14*	15	14* (15)	15
17	15	23*	29** (15)	14*	23* (14)	29**	23, 29*	15
18	10	10	10 (3)	5*	3*	15*	10	10
19	9	9	9	9	9	9	9	9
20	29** (2)	2	2	2	29** (2)	2	2	2
Error Rate	4	5	2	6	5	3	4	—

NOTE: Numbers in parentheses indicate the analyst's second choice.

\* Identification deviates from consensus score and is an error.

\*\* Identification deviates from consensus score but is not an error because Type 29 is indeterminate.

Type 17 to 19 by only one vote, so this change simply suggests that this specimen could be typed as either Owl Creek Black or Cowhouse Dark Gray. Although Specimens 14 and 16 presumably represent Types 14 and 15, respectively, the majority of analysts reversed these two (i.e., 14 = Type 15 and 16 = Type 14). These two specimens demonstrate the considerable overlap in the appearance of Fort Hood Gray and Gray-Brown-Green. This is not surprising since Frederick (in Trierweiler, ed. 1994:C8) had previously observed that these types are "stratigraphically overlapping, closely related, and difficult to distinguish." Finally, Specimen 17 is supposed to be Gray-Brown-Green (Type 15), but only one analyst recognized it as such and no consensus type was identified.

#### ADDITIONAL HOUSE CREEK CHERT SAMPLES

After analyzing the 41CV1275 sample and

conducting the typology replication tests, the sample of House Creek cherts was expanded to better understand the Southeast Range chert types that might be present in the West Range. Four additional chert samples were collected in March 1997 from three sites along House Creek (one sample each from 41CV1222 and 41CV1286 and two samples from 41CV1250).

The methods used to sample and analyze chert flakes from these four House Creek localities were generally the same as previously described, with minor exceptions noted below. One flake from each cobble was selected as representative of the chert type. However, two flakes were removed from each of two cobbles that exhibited considerable variability throughout. The two flakes were specifically selected because they represented different variations within single cobbles. Thus, this sample of House Creek cherts consisted of 56 flakes from 54 nodules as follows: 41CV1222—18 flakes from 17 nodules; 41CV1250-1—14 flakes from 13 nodules;

**Table 73. Chert typology analysis data from second replicability test, compared by consensus types**

Specimen Number	Analysts						Consensus
	II	III	IV	V	VI	VII	
1	4	4	4	4	4	29** (4)	4
2	6	6	6	6	6	6	6
3	2	2	2	2	2	2	2
4	6*	18*	29** (7)	8	8	8	8
5	9 (10)	9	9	9	9	9	9
6	8	8	8	8	8	8	8
7	10	10	10	15*	10	10	10
8	29**	5*	3* (29)	23*	29 (3)	29	29 (3)
9	13	13	13	13	13	13	13
10	19*	19*	17* (19)	17*	19	16* (14)	19 (17)
11	6	6	6	6	28* (6)	6	6
12	14	14 (5)	14	14	14	14	14
13	29** (6)	6 (7)	6	6	6	6	6
14	15	14*	15 (14)	15	14* (15)	15	15 (14)
15	17	17	17	17	17	17	17
16	14	14	15*	14	14	15*	14 (15)
17	15*	23*	29 (15)	14*	23 (14)	29	none (15, 23, 29)
18	10	10	10 (3)	5*	3*	15*	10 (3)
19	9	9	9	9	9	9	9
20	29** (2)	2	2	2	29** (2)	2	2 (29)
Error Rate	2	3	3	5	4	3	3.3 (16.5 percent)

NOTE: Numbers in parentheses indicate the analyst's second choice.

\* Indicated identification deviates from consensus score and is an error.

\*\* Identification deviates from consensus score but is not an error because Type 29 is indeterminate.

41CV1250-2—14 flakes from 14 nodules; and 41CV1286—10 flakes from 10 nodules. The sample localities are described individually below.

#### Sample 41CV1222

This sample consists of cherts from House Creek channel gravel bars on the south side of 41CV1222, about 200 m upstream from where Ripstein Creek empties into House Creek. The extensive gravel bars exposed in the channel yielded numerous large cobbles of chert (15–20 cm in maximum dimension). The 17 chert cobbles comprising this sample are characterized as tabular to round, with well-rounded edges resulting from stream transport.

While at 41CV1222, two gravel bars in Ripstein Creek along the north side of the site were examined, but only two small chert cobbles were found. The gravel outcrops were not extensive, but it was somewhat surprising to find so little chert. No sample was taken at this

locality.

#### Sample 1, 41CV1250

This sample consists of cherts from a House Creek gravel bar immediately south of the site. These gravel bars were extensive and included some large chert cobbles (up to 18 cm in maximum dimension). Although not as abundant as in the channel gravels, some fairly large chert nodules also were collected from old gravel bars exposed in the terrace cutbank on the north side of the creek. The 13 collected specimens are rounded to tabular, with well-rounded edges due to stream transport. Compared with the channel gravel samples from 41CV1222 and 41CV1286, the chert cobbles in this sample are more spherical and have been transported greater distances by House Creek. Also, the presence of large limestone rocks (up to boulder sized) in the channel gravels at this point indicates a much higher stream competence than at other sampled channel locations.

### **Sample 2, 41CV1250**

The second sample at 41CV1250, consisting of 14 cobbles, was collected in two places on the T<sub>2</sub> terrace where limestone cobbles were exposed on the surface and shallowly buried. The two collection areas correspond to Chert Zones 1 and 2 at 41CV1250 (respectively) as described by Trierweiler (ed. 1994:A1394). The Chert Zone 1 sample is from the central portion of the site, and the cherts appear to be fluvial lag gravels on the high Pleistocene strath terrace. Most of these specimens were tabular to rounded and looked like stream-rolled cobbles. The Chert Zone 2 area, just to the northeast of Chert Zone 1, appeared to be along an exposed ridge of bedrock. Although this could not be definitely confirmed, previous investigators noted that "Chert Zone 2 consisted of sparse, patchy nodules weathering out of the bedrock slope on the northeastern [site] boundary" (Trierweiler, ed. 1994:A1394). If this assessment is correct, Chert Zone 2 may actually represent a primary chert outcrop within the Glen Rose Formation or an unmapped remnant of Edwards Group formations, the existence of which has been previously hinted at by Frederick and Ringstaff (1994:140). Previous investigators also noted that there was little difference in the types of cherts found in Chert Zone 1 and 2. The most common chert type observed in both areas was the translucent white, coarse-grained "novaculitic" material easily recognizable as Seven Mile Mountain Novaculite (Type 4). Although most of the gravels were fist sized or smaller, some large cobbles were found (up to 16 cm in maximum dimension). Occasional flakes and tested cores indicate that these outcrops were utilized by prehistoric peoples, but specimens that had been definitely modified were very rare in the area where the cobble samples were taken.

### **Sample 41CV1286**

This sample consists of 10 chert cobbles collected from House Creek channel gravel bars and from gravel lenses exposed in terrace cutbanks on both sides of the creek. The collection locality is ca. 100–150 m upstream (west) of the tank trail crossing at the northeastern end of 41CV1286. These samples correspond to Chert Zone 1 at 41CV1286 as described by Trierweiler (ed. 1994:A1430). Compared with the House

Creek channel gravel samples farther downstream (i.e., 41CV1222 and Sample 1 from 41CV1250), the chert nodules at this locality were smaller (up to 15 cm but generally less than 10 cm in maximum dimension) and less well rounded from stream transport. Access to gravel bars and terrace exposures was limited because of the water level at this point, but the overall density of cherts seemed to be rather low compared with the other channel gravel localities.

### **Results**

The results obtained by each of the seven analysts, again listed roughly in order of experience, are compared in Table 74. Five of the analysts had participated in one or both of the other two typological analyses. The eighth and ninth analysts were new to the chert typology study. Analyst VIII had some experience with lithic analysis and central Texas cherts, but not specifically with Fort Hood cherts. Analyst IX had very limited experience with lithic technology and materials.

Individual error rates for this analysis ranged from 8 (14.3 percent) to 22 (39.3 percent) and averaged 16 (28.6 percent). Although the individual error rates vary more in this analysis than in the previous typology tests, the average error rates are fairly consistent between all of the tests. Of the 56 samples, only five are not assigned to a consensus type, and only four are assigned to the unidentified type. Thus, 47 specimens (83.9 percent) are identified by consensus as representing eight different chert types. Some of the same patterns observed in the previous tests also are evident in this analysis. Type 4 (Seven Mile Mountain Novaculite) is very distinctive and was consistently recognized by all analysts. Even when two flakes from the same nodule (Specimens 4 and 7) were added to the test because they looked slightly different, all of the analysts typed them the same. In contrast, the two flakes from another nodule (Specimens 36 and 37) were typed differently. All but one analyst typed Specimen 36 as either Type 3 (Anderson Mountain Gray) or 7 (Fossiliferous Pale Brown), while Specimen 37 was classified as Type 10 (Heiner Lake Blue) by all but one analyst. These specimens hint at the potential variability of cherts from the same cobble. Even more revealing, however, is the fact that flakes from the same cobble were identified as either

Table 74. Comparison of House Creek chert typology analysis data (samples from 41CV1222, 41CV1250, and 41CV1286)

Specimen (Sample Number)	Analyst						
	III	IV	V	VIII	VI	VII	IX
1 (41CV1250-1)	7* (24)	29	22*	28* (7)	29	29 (24)	22* (18)
2 (41CV1250-1)	7 (22)	29**	6*	7	21*	3	7 (3)
3 (41CV1250-1)	18 (23)	3	3	18 (23)	18	3	23* (18)
x4 (41CV1250-1)	4	4	4	4	4	4	4
5 (41CV1250-1)	3 (5)	3	3	3 (5)	10* (3)	3 (10)	3
6 (41CV1250-1)	10 (3)	10	10	5*	10	10	3*
x7 (41CV1250-1)	4	4	4	4	4	4	4
8 (41CV1250-1)	3 (6)	3	3	5*	3	3	3
9 (41CV1250-2)	23*	18	18	26*	18	23*	18
10 (41CV1250-2)	7*	3 (5)	6*	28* (6)	28*	3	3
11 (41CV1250-2)	1 (2)	1	2*	1	1	28*	2*
12 (41CV1250-2)	10	10	10	10	10 (3)	10 (3)	10
13 (41CV1250-1)	10 (13)	10	5*	27*	10	10	10
14 (41CV1250-1)	4	4	4	4	4	4	4
15 (41CV1250-1)	10* (6)	3	3	3	3	3	3
16 (41CV1250-1)	10*	3	3	3 (5)	3	3	3
17 (41CV1250-1)	23* (10)	3	3	26* (28)	3	3	3
18 (41CV1250-1)	4	4	4	4	4	4	4
19 (41CV1250-2)	7	18*	7	7	24*	29** (24)	18* (24)
20 (41CV1250-2)	24	18*	22*	7*	18*	29** (24)	7* (22)
21 (41CV1250-2)	10 (3)	10	10	18*	14* (3)	10	3* (10)
22 (41CV1250-2)	6* (22)	22* (18)	7*	22*	18*	29**	7* (18)
23 (41CV1250-2)	4	4	4	4	4	4	4
24 (41CV1250-2)	21	21 (27)	29**	21	20*	29** (24)	21 (29)
25 (41CV1250-2)	23*	10*	3*	18*	14*	10*	3* (10)
26 (41CV1250-2)	4	4	4	4	4	4	4
27 (41CV1250-2)	4	4	4	4	4	4	4
28 (41CV1250-2)	4	4	4	4	4	4	4
29 (41CV1222)	3	3	6*	29**	7*	3	3
30 (41CV1222)	23*	3	3	3 (6)	28*	3	28* (23)
31 (41CV1222)	3	3	3	21* (7)	3	3	3
32 (41CV1222)	18*	3*	28	28	28	29** (3)	23*
33 (41CV1222)	29	29	7*	5* (29)	23*	3*	29 (23)
34 (41CV1222)	4	4	4	4	4	4	4
35 (41CV1222)	3	3	3	3	3	3	3



Table 74, continued

Specimen (Sample Number)	III	IV	V	Analyst			VI	VII	IX	Consensus
				VIII						
x36 (41CV1222)	3	3	7	7			29**	3	7 (3)	3, 7
x37 (41CV1222)	10	10	10	10			10	10	3* (18)	10
38 (41CV1222)	3* (24)	10* (5)	3*	21*			21*	24*	10* (3)	none (3, 10, 21, 24)
39 (41CV1222)	3	3	3	3			3	3	3	3
40 (41CV1222)	10* (3)	3	3	18*			3	3	3	3
41 (41CV1222)	4	4	4	4			4	4	4	4
42 (41CV1222)	3	3	7*	21* (7)			3 (7)	3	3	3 (7)
43 (41CV1222)	3	3	3	3			3	3	3	3
44 (41CV1222)	3	3	3	3			3	3	3	3
45 (41CV1222)	28	28 (3)	1*	28			28	29** (3)	28	28 (3)
46 (41CV1222)	2*	3	3	21* (7)			3	3	10*	3
47 (41CV1286)	7* (3)	3	3	22*			3	3	3	3
48 (41CV1286)	3	3	3	3			18* (21)	10* (3)	24*	3
49 (41CV1286)	5* (3)	3	3	7*			3	3	3	3
50 (41CV1286)	3	3	7*	3			7*	3	3	3 (7)
51 (41CV1286)	28* (6)	3*	29**	8*			8* (15)	6*	3*	none (3, 6, 8)
52 (41CV1286)	28	28	2*	28			28	28	28	28
53 (41CV1286)	29 (7)	29 (10)	3*	29			29	9*	23* (18)	29
54 (41CV1286)	7*	3*	7*	20*			29**	29**	3*	none (3, 7, 29)
55 (41CV1286)	2* (28)	28	2*	1* (2)			28 (2)	28	28 (1)	28 (1, 2)
56 (41CV1286)	7* (28)	29	29	29			23*	9*	23*	29 (23)
Error Rate	20	8	18	22			17	9	19	16 (28.6 percent)

NOTE: Numbers in parentheses indicate the analyst's second choice.

\* Identification deviates from consensus score and is an error.

\*\* Identification deviates from consensus score but is not an error because Type 29 is indeterminate.

x = Flakes 4 and 7 are from the same cobble; flakes 36 and 37 are from the same cobble.

West Range Type 3 or Southeast Range Types 7 and 10. Looking at the consensus types (and second choices) assigned to all of these House Creek specimens, it is clear that Types 3, 7, and 10 are commonly confused. Other confused types include Types 1 and 2 (two examples); Types 3, 18, 23, and 28 (six examples); and Types 18, 22, and 24 (three examples). Also, of 56 House Creek specimens in this analysis, there are 10 examples (17.9 percent of the sample) where no consensus was reached or the consensus type was indeterminate (Type 29).

### SUMMARY AND CONCLUSIONS

The comparative chert typology analyses data reported herein accomplish four primary goals: (1) they provide a basis for understanding the replicability of classifying cherts by types using the Fort Hood comparative collection; (2) they provide a basis for understanding the expected error rate involved when any given individual conducts a chert typology analysis; (3) they provide evidence for evaluating the level of experience an analyst needs to conduct a chert typology analysis; and (4) they provide preliminary data on the types of cherts that are (and were) present as upland residual gravels and channel gravels in the generally chert poor area of the southern West Range.

Based on these comparative analyses, a high degree of replicability in the process of classify-

ing flakes within the Fort Hood chert typology is evident. The average number of errors per individual analyst is 23.1 on the entire sample of 88 specimens, for an average error rate of 26.3 percent (based on 162 total errors among seven analysts). Despite this seemingly high error rate, the sources of the errors are rather consistent in that some types are easy to recognize while others are not. The analysis data point out some of the problem areas, such as the confusion with Fort Hood Gray and Gray-Brown-Green, and a significant degree of overlap between Anderson Mountain Gray, Fossiliferous Pale Brown, and Heiner Lake Blue.

The typology analysis data also suggest that some analysts are more consistent than others in typing chert specimens (Table 75). This statement is supported by the fact that the total error rates for individual analysts range from 14.8 to 46.4 percent. Thus, some analysts are more likely to type any given sample of cherts closer to what the "consensus" of several analyst would be. On the other hand, the data suggest that there is no particular correlation between an analyst's error rate and his/her level of lithic analysis experience or familiarity with the Fort Hood chert typology. The most experienced analysts did not necessarily score any higher than did the least experienced analysts.

By comparing the number of errors to the number of times analysts used the "unidentified" classification (Type 29), another interesting

Table 75. Summary of error rates for various lithic analysts

Analyst*	Percentage Error Rates			Totals
	41CV1275 Sample (12 flakes)	Second Replicability Test (20 flakes)	House Creek Samples (56 flakes)	
I	33.3	—	—	—
II	33.3	10.0	—	—
III	25.0	15.0	35.7	29.5
IV	16.6	15.0	14.2	14.8
V	25.0	25.0	32.1	29.5
VIII	—	—	39.2	—
VI	16.6	20.0	30.4	26.1
VII	25.0	15.0	16.1	17.0
IX	—	—	33.9	—
Error Rate	25.0	14.5	28.8	23.4**
* Analysts are ranked here in order of experience.				
** Total error rate is based on 103 errors out of 440 flakes for the five analysts who examined all three samples. The average individual error rate is 20.6 errors out of 88 flakes.				

methodological pattern appears (Table 76). The analysts who scored best were generally those who used the "unidentified" classification (Type 29) most often and at the most appropriate times (i.e., when most analysts disagreed on the identification or typed the specimen as unidentified). Analysts who had the highest error rates tended to be more reluctant to classify a specimen as unidentified and sometimes classified specimens as unidentified when most of the other analysts agreed on a type assignment. The data for the five analysts who classified all 88 of the specimens clearly show a strong correlation between more frequent use of the unidentified class and lower error rates. This suggests that the most efficient analytical approach is very conservative.

The five House Creek chert samples also provide some interesting insights into the chert sources in the southern portion of the West Range. Although these localities do not contain much chert when compared to the better chert

outcrops in the northern and eastern portions of Fort Hood, they all have enough cherts to constitute a viable source of raw materials. Ranked in terms of their relative (to each other) densities and sizes of cherts available, the House Creek alluvial channel gravels at 41CV1222 constitute the best source, while the House Creek channel gravels at 41CV1286 represent the worst (Table 77). These localities represent only a tiny sample of the materials that were available all along House Creek and prove that this drainage basin was not devoid of useful cherts. Rather, it appears that the House Creek area may be characterized by a low density of cherts scattered consistently along the creek as channel gravels and sporadically on the uplands as lag gravels (noting the possibility that some upland chert outcrops are primary). It seems clear that people did not have to travel far to find usable cherts within the House Creek drainage basin.

Brown (1997) has raised an issue of consid-

**Table 76. Summary of error rates and use of unidentified (Type 29) by various lithic analysts**

Analyst (ranked in order of experience)	Number of Errors/Number of Unidentified Specimens			Totals
	41CV1275 Sample (12 flakes)	Second Replicability Test (20 flakes)	House Creek Samples (56 flakes)	
I	4/1	—	—	0
II	4/3	2/3	—	0
III	3/0	3/0	20/2	26/2
IV	2/1	3/2	8/5	13/8
V	3/1	5/0	18/3	26/4
VIII	—	—	22/3	0
VI	2/2	4/2	17/4	23/8
VII	3/2	3/3	9/8	15/13
IX	—	—	19/1	0
Totals	21/10	20/10	113/26	103/35
Average	3/3	3/2	16/4	21/7

**Table 77. Comparison of House Creek chert sample localities as lithic source areas**

Sample Number	Type of Chert Outcrop	Chert Nodule Density	Average Size of Chert Nodules
41CV1222	Channel gravels	high	large
41CV1250-1	Channel gravels	moderate	large
41CV1250-2	Upland lag gravels or primary outcrop*	moderate	medium
41CV1275	Upland lag gravels*	moderate	medium
41CV1286	Channel gravels	low	small

\*Degree of weathering of nodules may be a factor in chert selection.

erable importance when interpreting patterns of chert acquisition and use in Central Texas. He suggests that stream bedload gravels (i.e., active channel gravel bars and fossil gravel bars exposed on or in alluvial terraces) may have been important sources of chert for prehistoric knappers, but archeologists should not assume that such gravel sources were available throughout prehistory just because they are exposed today. He points out that during mesic periods when floodplain aggradation was the norm (as opposed to xeric times when stream erosion and redeposition were more common), bedload cherts were probably not as widespread or accessible. This statement is generally true, especially for larger stream channels (e.g., Leon River and Cowhouse Creek) on Fort Hood. However, this rule probably does not apply equally to all fluvial channels. It is likely that accessibility of bedload gravels in smaller tributaries, such as House and Ripstein Creeks on Fort Hood, was much less affected by fluctuating precipitation, even during extended periods when wetter conditions prevailed.

The average annual precipitation in the Fort Hood area is 32 to 34 inches based on the 84-year record for Temple (Bell County) and the 59-year record for Gatesville (Coryell County) (1982–1983 *Texas Almanac*). The most important factor, however, is that this rainfall varies greatly from season to season. While April–June and September–October are generally wet, dryer conditions prevail during November–March and especially during July and August. Even if overall rainfall were greater at various times in the past, it probably varied considerably on a seasonal basis. For example, if the annual rainfall were greater by a magnitude of 50 percent, it may have raised the stream flow in the major channels to the point that bedload cherts were never accessible during most years. In contrast, it is likely that the stream flow in smaller tributaries would have still fluctuated greatly during any given year and that bedload cherts would have still been a viable lithic resource at times.

Brown (1997) suggests that the answer to this problem is relatively simple in that one only needs to look at the cortex on large samples of debitage from archeological sites to determine if prehistoric peoples were using stream bedload cherts, upland sources such as bedrock ledges or nodule exposures, or residual gravels on high terraces of uplands. In many parts of Central

Texas—and the House Creek area of Fort Hood is a good example—this may be easier said than done. Although the debitage samples obtained during the 1996 testing are not large enough to support reliable results, a quick comparison of the debitage from sites along House Creek with the House Creek chert source samples discussed in this chapter points out a major analytical problem. It seems likely that it will prove to be virtually impossible to distinguish the debitage derived from bedload sources from debitage derived from upland residual gravel sources or heavily weathered bedrock nodules.

The House Creek chert sources do not exhibit a great deal of diversity in terms of the chert types represented. Only nine different types of chert were identified among the 66 flakes in the analysis sample (excluding 2 redundant flakes). When the individual flakes are compared by their identified chert types and the number of votes in the consensus, the relative strengths of the identifications may be examined (Table 78). Chert Type 4 was always identified with a great deal of confidence, whereas chert Types 3, 6, and 10 were usually identified with a moderate to high degree of confidence. The other types (7, 18, 21, and 28) were not identified with much confidence.

Within the House Creek samples, Anderson Mountain Gray is the most abundant type (22 specimens), followed by Seven Mile Mountain Novaculite<sup>3</sup> (12 specimens). Combined, these two types make up 51.5 percent of the entire sample ( $n = 66$ ) and are found in almost all sample localities (Table 79). This probably reflects some degree of reality since these two types are recognized as the most common cherts in the West Fort chert province. What is somewhat unexpected is that 10 specimens, representing 15.2 percent of the sample, are classified as Southeast Range chert types. The analysis data provide conclusive proof that at least one chert

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<sup>3</sup>In his review of a draft version of this report, Jim Abbott noted that identification of the Seven Mile Mountain Novaculite is problematic. He stated, "I have become convinced that the hard, macroporous crystalline material termed 'Seven Mile Mountain Novaculite' is not a true chert at all, but rather remnants of an ancient soil silcrete. In other works, I would not expect it to bear any relation to the distribution of chert-bearing bedrock."

**Table 78. Summary of identified chert types by consensus scores for all five House Creek sample localities\***

Identified Chert Types	Number of Votes in Consensus**					Total Number of Specimens
	3	4	5	6	7	
1 Heiner Lake Blue-Light	—	1	—	—	—	1
3 Anderson Mountain Gray	1	4	7	6	4	22
4 Seven Mile Mountain Novaculite	—	—	1	—	11 (1)	12 (1)
6 Heiner Lake Tan	—	—	1	—	—	1
7 Fossiliferous Pale Brown	2	—	—	—	—	2
10 Heiner Lake Blue	—	1	2	2	1	6
18 Cowhouse Two Tone	—	1	—	—	—	1
21 Cowhouse Light Gray	—	1	—	—	—	1
28 Table Rock Flat	1	—	3	1	—	5
Uncertain (Types 3/7, 3/10, and 3/18)	1 (1)	1	—	—	—	2 (1)
Totals	5 (1)	9	14	9	16 (1)	53 (2)

NOTE: Number in parentheses represents a flake from same nodule as another flake.

\* Excluded from this table are 5 unidentified (Type 29) specimens and 8 specimens for which no consensus was reached.

\*\* Based on consensus scores by seven analysts in Tables 70 and 74.

**Table 79. Summary of identified chert types represented in the House Creek sample localities**

Chert Types (chert province)**	Number of Specimens per Site*					Total Specimens
	41CV1222	41CV1250-1	41CV1250-2	41CV1275	41CV1286	
1 Heiner Lake Blue-Light (SE)	—	—	1	—	—	1
3 Anderson Mountain Gray (WF)	10	5	1	2	4	22
4 Seven Mile Mountain Novaculite (WF)	2	3 (1)	4	3	—	12 (1)
6 Heiner Lake Tan (SE)	—	—	—	1	—	1
7 Fossiliferous Pale Brown (SE)	—	1	1	—	—	2
10 Heiner Lake Blue (SE)	1	2	2	1	—	6
18 Cowhouse Two Tone	—	—	1	—	—	1
21 Cowhouse Light Gray	—	—	1	—	—	1
28 Table Rock Flat	2	—	—	1	2	5
— Uncertain (Types 3/7, 3/10, and 3/18)	(1)	1	—	1	—	2 (1)
29 Unidentified	1	1	—	1	2	5
None (no consensus)	1	—	3	2	2	8
Totals	17 (1)	13 (1)	14	12	10	66 (2)

NOTE: Number in parentheses represents a flake from same nodule as another flake.

\* Based on consensus scores by seven analysts in Tables 70 and 74.

\*\* Chert provinces as described by Frederick and Ringstaff (1994:154–156): SE = Southeast Range; WF = West Fort.

type (Heiner Lake Blue, Type 10) whose occurrence was formerly thought to be restricted to the Southeast Range is in fact present in some quantity in the West Fort area. Fossiliferous Pale Brown (Type 7), another chert type typical of the Southeast Range and previously known to

occur in the live fire area south of House Creek (i.e., observed in PK grid 16/51 by Frederick and Ringstaff [1994:152]), also was found to occur along House Creek in the West Range.

The results of the House Creek chert typology analyses confirm the suspicions of previous

researchers that our knowledge of the distribution of chert types across Fort Hood is problematic. Abbott and Tomka (1995:679–680) point out that the chert sources in the live fire area are virtually unknown and hint that there may be more overlap in the types of cherts assigned to specific chert provinces than we realize. It is also suggested that Southeast Range chert types may exist well beyond the currently defined Southeast Range chert province and that Southeast Range cherts might eventually be found to occur in areas of Fort Hood that are not well known or have not been surveyed for chert resources (Abbott and Trierweiler 1995a:56–58; Trierweiler, ed. 1994:277). The possibility that Southeast Range chert types might occur in the live fire and West Fort areas became even more apparent after the 1995 field season, as noted by Mehalchick et al. (1999:400–401, 409). In fact, it was these doubts that led to the 1996–1997 collection and analysis of House Creek chert samples reported herein. The evidence presented here confirms that cherts recognizable as the Southeast Range type Heiner Lake Blue are commonly found in the alluvial and lag gravels in the House Creek drainage. Given the considerable overlap between chert specimens typed as Heiner Lake Blue and Anderson Mountain Gray, it appears that these two chert types are little more than variations of the same basic material, and these variants occasionally grade into each other to the point that they are indistinguishable (note that two flakes from the same nodule were identified as Types 3 and 10; see Specimens 36 and 37 in Table 74).

#### RECOMMENDATIONS FOR FUTURE TYPOLOGICAL ANALYSES

The collection and typological analyses of cherts reported herein provide a useful data set for further understanding the Fort Hood chert typology and refining the ways in which we use it. From a methodological standpoint, it is comforting to see consistency in the results obtained by different lithic analysts with varying degrees of experience. Even so, it appears that some people are better than others at typing the chert specimens; while it cannot be said that someone is more correct (since there are no definite right or wrong answers), some individuals were very consistent in always having a higher frequency of their scores fit the “consensus” type recognized

by most other analysts. However, the analysts who were best at typing the cherts were not necessarily those with the most in-depth knowledge of lithic analysis or materials (either general or specific to Central Texas or Fort Hood). In fact, one of the analysts with the least amount of relevant experience (i.e., a historic archaeologist with only limited knowledge of lithics and no familiarity with Fort Hood cherts) was the second most consistent of the five people who analyzed all of the samples (see Tables 75 and 76, Analyst VII). This suggests that a person’s ability to perceive subtle differences (e.g., colors, textures, amount and types of mottles and inclusions, and complex combinations of these variables) is far more important than an intimate knowledge of Fort Hood cherts. Put quite simply, some people will be better at classifying chert specimens within a defined chert typology than will others, regardless of how much chert knowledge they possess.

One general recommendation may be offered based on these typological studies. It seems clear that the analysts’ error rates (which represent deviations from the consensus types that most analysts would recognize) are directly linked to how conservative or liberal each person was in their analytical philosophy. Analysts who tried to force questionable specimens into defined types made more errors, while those who were more willing to classify questionable specimens (i.e., flakes with attributes similar to two or more types) as unidentified made fewer errors. Consequently, the results of any given typological analysis using the Fort Hood chert taxonomy will be far more accurate, and interpretations based on the data will be more trustworthy, if analysts are extremely conservative. In discussing the results with all of the analysts, everyone agreed that they classified flakes that fit the classic chert type characteristics with confidence, while they were much less confident about flakes that were most similar to nonclassic variations within a type. Thus, the best approach is to only assign specimens to a chert type if it closely matches the “classic” characteristics of a type. Analytical results will be most accurate if analysts generally ignore most of the variability within types and concentrate only on the characteristics that define the types.

While the “classic” (or archetypal) varieties of Fort Hood Gray (Type 14) and Gray-Brown-Green (Type 15) may be very different, two of the

specimens in the second replicability test (see Table 72) show that the degree of overlap between these types is considerable. Since these two types outcrop in the same places, the distinction between them is largely irrelevant for interpretive purposes. Thus, while it is recommended that Types 14 and 15 be retained in the Fort Hood chert taxonomy to encompass this variability, it should be acknowledged that these types are essentially the same for all practical purposes. While they are known to occur together in one source locality in the North Fort province, this does not preclude the possibility that Type 14 or Type 15 cherts might be found to crop out alone somewhere else.

In a similar situation, the "classic" varieties of Anderson Mountain Gray (Type 3) and Heiner Lake Blue (Type 10) are very distinctive, but the specimens in the House Creek samples demonstrate that these two types grade into each other. Many of the flakes that fall into this overlap zone were classified into both types by different analysts. Since the classic varieties are so distinctive, it is recommended that Types 3 and 10 be kept in the Fort Hood chert taxonomy. However, because many House Creek specimens were classified as Type 10, and some individual House Creek specimens grade from Type 3 into Type 10, Heiner Lake Blue should no longer be considered to be exclusively confined to the Southeast Range chert province. Types 3 and 10 should be viewed as opposite ends of a continuum of chert variation which occur together in the West Range. It also is possible that Type 3 occurs in the vicinity of the Type 10 outcrops around Heiner Lake. Trierweiler (1996:550) notes the possibility that "a close analog to Anderson Mountain Gray may also be a Southeast Range material."

The two specimens in the House Creek samples that were identified as Fossiliferous Pale Brown (Type 7) also are significant (see Table 74). They indicate that this type should no longer be considered to be exclusively confined to the Southeast Range chert province.

Of similar concern are observations made by the analysts regarding the secondary source samples in the Fort Hood chert taxonomy. All of the analysts were told before the studies that Fort Hood Types 1–17 were defined based on primary outcrops of chert, while Types 18–28 were defined based on secondary outcrops (i.e., channel gravels) in the bedloads of Cowhouse

and Table Rock Creeks. Types 18–27 were collected from the same locality in the Cowhouse Creek channel at the western edge of Fort Hood, while Type 28 was collected from the Table Rock Creek channel where it enters the west side of Fort Hood (Abbott and Trierweiler 1995b:I-8 to I-12). These bedload types are groups of chert "of similar appearance which presumably represent discrete types of chert that have been eroded from Edwards Group outcrops west of Fort Hood" (Abbott and Trierweiler 1995a:57). At the conclusion of our analyses, all of the analysts were asked to give their impressions and reach a consensus regarding the chert typology in general and the bedload chert types in particular (Table 80). Their observations regarding bedload chert types are discussed in more detail below.

There was a strong consensus among the analysts that serious problems exist with some of the bedload chert types, while other bedload types appear to be valid. One problem area discussed is that there is no basis for recognizing the amount of variability introduced to bedload cherts as a result of "weathering" and/or long-term saturation occurring when nodules become part of a stream's bedload. An examination of the type card specimens for Types 18–28 suggests that many of the flakes came from nodules that were darker toward the center and lighter near the exterior. The same phenomenon was observed on many of the stream nodules in the House Creek samples reported here. Thus, the presence of two color tones (i.e., light vs. dark variants) may be a meaningless variable with regard to bedload cherts. The analysts also believed that the cortex of stream nodules was too variable (i.e., in terms of color, texture, and thickness of the cortex rind) and should not be used as an attribute for defining chert types represented in channel gravel deposits. They agreed that some of the bedload chert types probably were not valid at all because no "classic" characteristics were apparent when looking at the type specimens (i.e., the flakes on the chert typology cards).

Although our samples did not contain any specimens identified as Cowhouse Shell Hash (Type 20) or Cowhouse Brown Flecked (Type 25), the analysts generally agreed that these types are so distinctive as to be valid (i.e., they represent distinctive varieties of chert that actually outcrop somewhere west of Fort Hood). Cowhouse

**Table 80. Summary of analysts' observations relating to selected chert types in the Fort Hood chert taxonomy**

Chert Type	Is the Type Valid?	Comments
3	yes	grades into Type 10
10	yes	grades into Type 3
14	yes	some variants are indistinguishable from Type 15
15	yes	some variants are indistinguishable from Type 14
18	no	too much variability within type; no "classic" variant exists
19	no	too similar to Types 17 and 14/15
20	yes	very distinctive
21	uncertain	looks fairly distinctive
22	no	nearly identical to Type 6
23	no	too much variability within type; no "classic" variant exists
24	uncertain	very similar to Types 27, 4, and 5
25	yes	very distinctive
26	uncertain	looks fairly distinctive
27	uncertain	very similar to Types 24, 4, and 5
28	no	too much variability within type; no "classic" variant exists.

Light Brown (Type 21) is fairly distinctive and may be a valid type, but only one flake was assigned by consensus to this type. Cowhouse Streaked (Type 26) also appears to be fairly distinctive and may be a valid type.

The analysts noted that two types of coarser-grained chert show some similar attributes that may overlap and grade into each other. These are Cowhouse Fossiliferous Light Brown (Type 24) and Cowhouse Novaculite (Type 27). Neither of these types was identified in our samples, but the analysts noted that the type specimens are quite similar to each other (one is slightly darker than the other), as well as to Seven Mile Mountain Novaculite (Type 4). In addition, Abbott and Trierweiler (1995b:I-10, I-12) suggest that Type 24 is similar to Texas Novaculite (Type 5). Notably, the type specimens for Types 24 and 27 are from stream-rolled nodules and Type 4 was also identified among the cobbles collected at this same bedload locality (Abbott and Trierweiler 1995a:57-58, 1995b:I-10 to I-12). Thus, it is possible that Cowhouse Types 24 and 27 are little more than weathered or stream-altered variations of the two common novaculites defined as primary sources (Types 4 and 5).

Most analysts agreed that five of the bedload types are particularly problematic and probably do not represent real chert types (see Table 80). Cowhouse Dark Gray (Type 19) encompasses a darker variety with specimens that most analysts would type as Owl Creek Black (Type 17) and a lighter variety with specimens that could easily

be identified as Fort Hood Gray (Type 14) or Gray-Brown-Green (Type 15). Similarly, Cowhouse Mottled with Flecks (Type 22) overlaps so closely with Heiner Lake Tan (Type 6) that the two are virtually indistinguishable. Abbott and Trierweiler (1995a:58) also note that Types 19 and 22 are the most problematic of the Cowhouse bedload types because they are hard to distinguish from Types 17 and 6, respectively. The analysts all felt that the other three types, Cowhouse Two Tone (Type 18), Cowhouse Banded and Mottled (Type 23), and Table Rock Flat (Type 28), are rather meaningless groupings that encompass too much variability in color, texture, banding, mottling, inclusions, etc. Although some specimens in our sample were assigned to Types 18 and 28 by consensus (1 and 5 flakes respectively), all of the analysts agreed that these types are difficult to use because no classic characteristics are defined. The analysts noted that many of the type-card flakes for Types 18, 23, and 28 could easily be classified into other primary chert types (Types 1-17). There also was a great deal of confusion for several House Creek specimens in our samples (see Tables 70 and 74) which were identified as Types 18, 23, or 28 by different analysts. Given the considerable uncertainty regarding what these types represent, it is recommended that Types 18, 19, 22, 23, and 28 be discarded from the Fort Hood chert taxonomy. It also is recommended that a great deal of caution be exercised before any new chert types are defined based



solely on stream bedload samples.

Ultimately, the Fort Hood chert taxonomy is only as useful as the meaningful interpretations of prehistoric human behavior that can be reasonably derived from it. The data and recommendations discussed here point out fallacies in many of the interpretations offered to date. For example, it has been shown that cherts typeable as Heiner Lake Blue and Fossiliferous Pale Brown do indeed occur in usable quantities in secondary contexts in West Fort Hood. Because of this, the previous interpretations which suggest that many of the cherts found in sites in the West Fort area were brought in from the Southeast Range chert province may be totally wrong. Previous studies by Mariah Associates (see Abbott and Trierweiler 1995a:Figures 8.7, 8.8, 8.9, 8.10, and 8.11) and Prewitt and Associates (Mehlich et al. 1999:Figure 88) have estimated that between 20 and 36 percent of the cherts in most sites across the western portion of Fort Hood were derived from the Southeast Range chert province. Unfortunately, these figures are incorrect because they are based on the assumption that Heiner Lake Blue and Fossiliferous Pale Brown are Southeast Range types, which we now know to be wrong. These two types may only account for a small percentage of the total identified specimens in any site grouping (e.g., up to 5.2 percent of the 33 percent of Southeast Range chert specimens identified in the Table Rock site group by Abbott and Trierweiler [1995a:Table 8.56]). However, these numbers will prove to be even more incorrect if continued research demonstrates that other chert types defined for the Southeast Range

chert province (or any provinces for that matter) are actually found outside the province.

The preceding discussion highlights some of the problems encountered when interpreting prehistoric patterns of chert utilization based on limited data. The interpretations offered to date regarding where peoples living in the Fort Hood area obtained their chert must be viewed as testable hypotheses rather than facts. There are many gaps in our knowledge of the distribution of chert sources across the landscape, particularly in the live fire area and immediately surrounding Fort Hood, so that we must be cautious when we formulate inferences of human behavior relating to raw material acquisition and use by prehistoric peoples. Much more work is needed to understand the natural spatial distribution of local cherts, and any reconstructions of prehistoric patterns of chert movement within the boundaries of Fort Hood should build upon the previous archeological work and seek to use larger and more reliable samples. Perhaps more important, the Fort Hood chert typology in its current state does allow for identification of cherts that are truly nonlocal. With a fair degree of confidence, we are able to recognize unusual cherts that must have come from somewhere off-post. Even without knowing precisely where these nonlocal cherts were obtained, this information may be far more meaningful than knowledge of immediately local cherts when considering prehistoric mobility. More analytical attention should be paid to recognizing and defining distinctive varieties of nonlocal cherts and identifying off-post source areas if possible.

# INTERPRETATIONS OF GEOARCHEOLOGICAL AND ARCHEOLOGICAL DATA

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All 42 prehistoric sites investigated by Prewitt and Associates during the 1996 season at Fort Hood are open campsites. They are divided into four site groups based on different geologic settings, topographic or hydrologic locations, and/or environmental characteristics (see Chapter 2 and Figure 2). Detailed discussions of the investigations and findings at each site are presented in Chapters 6 through 9, and recommendations for National Register eligibility are summarized in Chapter 13. For interpretive purposes, the discussions in this chapter are separated into these same four site groupings. In addition, this chapter also contains a comparative analysis of the cultural materials from all of the sites.

Paluxy sites, all of which occur in the western half of Fort Hood, are grouped together because of their occurrence in conjunction with weathered outcrops of Paluxy Formation sandstone and their distinctive topographic position on the eroded Killeen surface. Sites are assigned to two of the groups—House and Ripstein Creek sites and Cowhouse, Table Rock, and Cottonwood Creek sites—based solely on their locations relative to these drainage basins. The fourth category, other open sites, consists of five isolated sites scattered across the base in various drainage basins.

## PALUXY SITES

Fourteen of the tested sites occur wholly or partially within the Paluxy environment. General data and interpretations for these sites are summarized in Table 81. These sites are typically situated on gentle slopes. Although most of these sites are situated near or adjacent to unnamed, intermittent tributaries, their locations are correlated to the closest named drainage. Two of

the tested sites, 41CV1191 and 41CV1194, are situated near Ripstein Creek and contain sediments derived from the Paluxy Formation along with other Holocene-age colluvial and/or alluvial deposits (see Chapter 6). These two sites are included in the Paluxy site group, but they also are mentioned under the House and Ripstein Creek site group because portions of them are not directly related to the Paluxy environment.

Prior to Prewitt and Associates' 1996 field season, TRC Mariah Associates (Mariah) conducted geomorphic reconnaissance and shovel testing at 43 site management areas within the Paluxy environment at Fort Hood between 1991 and 1993 (Trierweiler, ed. 1994:327–333), and eventually completed National Register testing at eight Paluxy sites (Table 82). Burned rock mounds at Paluxy sites 41CV594 and 41CV1027 were tested with backhoe trenches and hand-excavated test units while Mariah was conducting a study of the structure and chronology of burned rock mounds on Fort Hood (Trierweiler, ed. 1994:203–206, 230–237). These sites were recommended as eligible for listing in the NRHP. Mariah then conducted two seasons of National Register testing at Fort Hood; between 1993 and 1995, additional testing was done at 41CV1027 and six other Paluxy sites were tested (Abbott and Trierweiler 1995a; Trierweiler 1996). For interpretive purposes, the eight sites tested by Mariah are included in the sample of Paluxy sites discussed herein. When the 14 sites tested by Prewitt and Associates are combined with the 8 sites tested by Mariah, the sample of 22 sites provides a viable dataset for further interpretation of Paluxy site archeology and the prehistoric activities that occurred in Paluxy settings in the western portion of Fort Hood (Figure 150).

**Table 81. Summary of Paluxy sites tested by Prewitt and Associates in 1996**

Site	Drainage	Analysis Unit	Temporal/Cultural Period	Subsurface Testing	
				BHTs	TUs
41CV947	Cowhouse Creek	1	Late Archaic	1	3
41CV984	Cottonwood Creek	1	Late Archaic		5
41CV988	Cottonwood Creek	1	Late Archaic into Late Prehistoric		8
41CV1043	Cottonwood Creek	1	unknown		6
41CV1049	Cottonwood Creek	1	Late Archaic	3	4
41CV1050	Cottonwood Creek	1	unknown	3	4
41CV1093	Cowhouse Creek	1	Late Archaic	1	5
41CV1106	Cowhouse Creek	1	Late Prehistoric (Toyah phase)		7
41CV1138	Table Rock Creek	1	Late Archaic	2	5
41CV1143	Table Rock Creek	1	Late Archaic into Late Prehistoric		3
41CV1191*	Ripstein Creek	3	unknown		2
41CV1194*	Ripstein Creek	1	unknown		1
41CV1258	House Creek	1	Late Archaic	2	6
41CV1283	Ripstein Creek	1	unknown		2

\*This site contains archeological remains in non-Paluxy sediments, but this component is not considered here.

### Geomorphic Observations

Paluxy sites are located on sandy outcrops of Paluxy Formation sandstone and/or encapsulated in colluvial sediments derived from the Paluxy and overlying Walnut Formations. The Paluxy Formation crops out and the colluvial sediments accumulated along the upper margins of Pleistocene-age valleys forming drapes up to 1–2 m thick in the western portion of Fort Hood (see Chapter 5). Pedogenesis has greatly altered the surficial sediments, forming varied soil catenas due to differing ages and local topography.

Two stratigraphic units identified at all Paluxy sites are defined as Strata I and II. Stratum I is late Holocene in age and contains all cultural features and artifacts found at Paluxy sites. Based on radiocarbon assays, primarily from buried cultural features, Stratum I accumulated between ca. 3500 and 500 B.P. at most Paluxy sites. Stratum I is typically less than 50 cm thick and pinches out downslope, although Stratum I sediments over 100 cm thick are not uncommon as infilled erosional gullies. The sediments are typically dark sandy loams imprinted with A, A-E, or A-Bw soil profiles. The contact between Strata I and II is abrupt to very abrupt and wavy.

The age of Stratum II is not known, although it is fairly clear that it was truncated by around

5000–4000 B.P. Since no in situ cultural materials and features have ever been recovered from Stratum II, it is believed that it started to accumulate during the late Pleistocene. The top of Stratum II is marked by a well-developed truncated Bt horizon. The Bt horizon is typically a sandy clay loam that grades in color from redder hues downslope to browner hues upslope. Soil structure also grades from strong, medium to coarse, blocky peds downslope to moderate blocky peds or weak, coarse, prismatic peds breaking to moderate blocky peds upslope. The Bt horizon overlies a BC horizon, which is typically a sandy loam to sandy clay loam. As with the Bt horizon, color and soil structure vary topographically. Stratum II typically rests directly on Glen Rose limestone, although a late Pleistocene caliche was observed underlying Stratum II at a few sites.

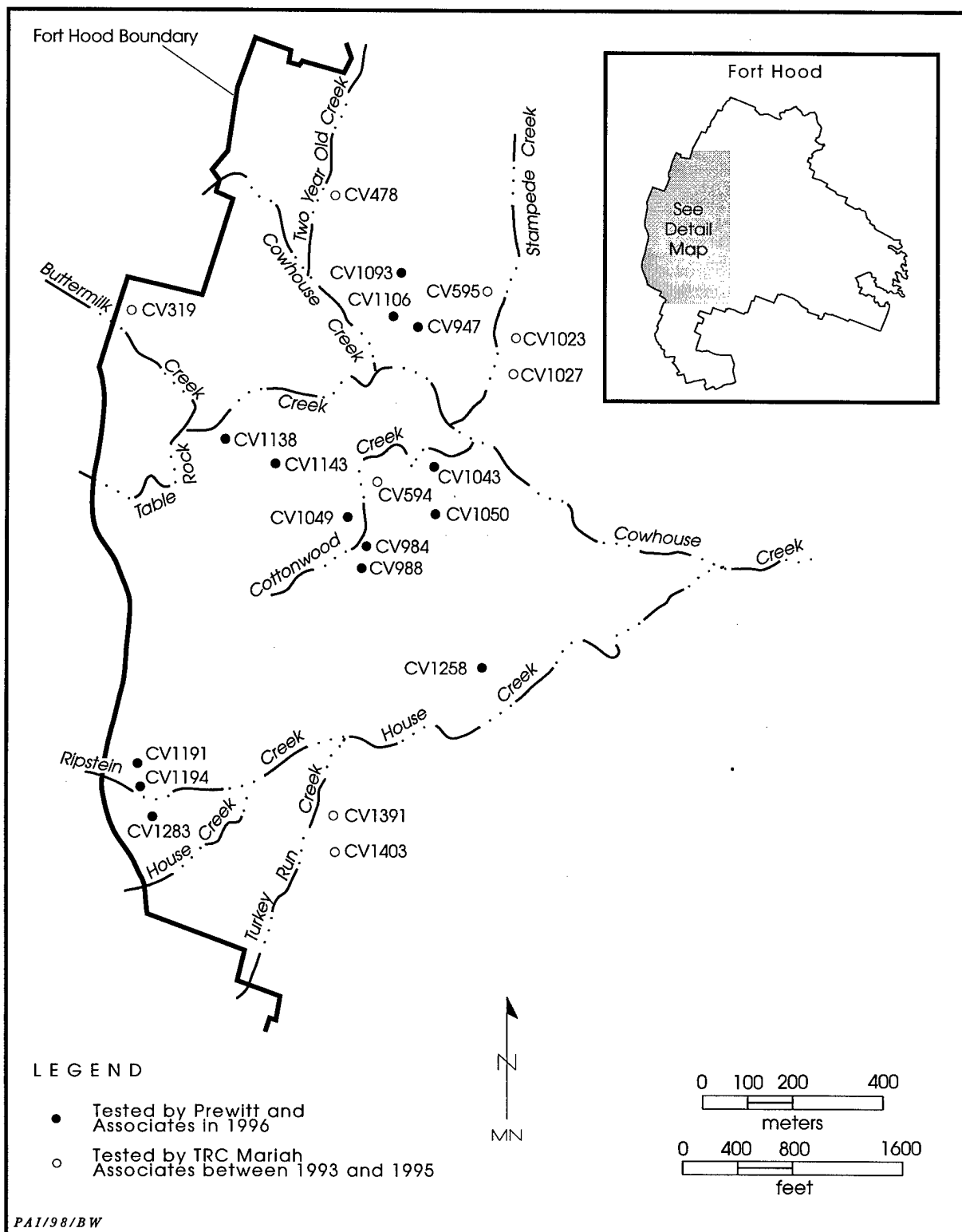
Deposition of these sediments appears to be dominated by surface flow in the form of sheetwash and/or rillwash and raindrop impact. In addition, mass wasting was probably an important depositional process in the early stages of formation of many Paluxy sites. However, two important factors must be present for these processes to form Paluxy sites. Paluxy site formation is dependent upon a relatively thick Paluxy Formation outcrop (generally 3 m or greater), which when undercut promotes the

Table 82. Summary of Paluxy sites tested by TRC Mariah Associates from 1991 to 1995

Site	Drainage	Subsurface Testing		Analysis Unit	Temporal/Cultural Period	Reference
		BHTs	TUs			
41CV319	Buttermilk Creek	1	4	1	Late Prehistoric (Austin phase)	Abbott and Trierweiler 1995a:450-459
41CV478	Two Year Old Creek		4	none	Early Archaic	Trierweiler 1996:338-345
41CV594	Cottonwood Creek	1	2	none	Middle and Late Archaic	Trierweiler, ed. 1994:230-233
41CV595*	Stampede Creek	4	4	1	Late Archaic and Late Prehistoric (Austin phase)	Abbott and Trierweiler 1995a:469-483
41CV1023	Stampede Creek		5	1	unknown	Abbott and Trierweiler 1995a:532-543
41CV1027	Stampede Creek	1	8	1	Middle Archaic	Trierweiler, ed. 1994:233-237;
41CV1391	Turkey Run Creek		5	2	Late Archaic and Late Prehistoric (Austin phase)	Abbott and Trierweiler 1995a:543-551
41CV1403	Turkey Run Creek	4	2	none	Middle Archaic	Abbott and Trierweiler 1995a:642-652
						Trierweiler 1996:478-486

\*This site was virtually destroyed by firebreak bulldozing during the range fires of spring 1996.

\*This site was virtually destroyed by firebreak bulldozing during the range fires of spring 1996.



**Figure 150.** Locations of tested Paluxy sites in the western portion of Fort Hood.

retreat of the Paluxy and Walnut Formations, and the formation of colluvial deposits. The Paluxy sandstone must be thick enough to contribute large quantities of sediment and not be completely buried by detritus shed from the overlying Walnut Formation. Also, the gradient of the Glen Rose limestone along the upper margins of Pleistocene valleys must be low to promote the accumulation of colluvial sediments. These factors coexist throughout the west-central portion of Fort Hood (see Chapter 5).

### Cultural Observations

All 14 sites in the present study yielded cultural materials. However, 5 sites—41CV1043, 41CV1050, 41CV1194, 41CV1258, and 41CV1283—were considered to have limited archeological research potential due to the absence of intact and spatially discrete cultural deposits. Although burned rock features were present at 4 of these sites, the Paluxy components were either too diffuse and amorphous to be interpretable or their contextual integrity was compromised (see Chapter 6). The burned rock features included two concentrations (Feature 4 at 41CV1043 and Feature 3 at 41CV1283), a 30-cm-thick midden (Feature 1 at 41CV1194), and a probable hearth (Feature 4 at 41CV1258) that date to the Late Archaic period.

The nine remaining sites each consist of one

analysis unit that corresponded to the Paluxy setting. Chronometric data were obtained from intact feature contexts on each site except 41CV1191. Twelve radiocarbon dates were obtained from 12 features at eight sites (Table 83). All of these dated features occur within the upper 75 cm of sediments; however, an undated occupation zone at 41CV947 has a maximum basal depth of 90 cm.

Spanning the Late Archaic and the transition into the Late Prehistoric period, seven sites contained 11 intact features that yielded radiocarbon ages ranging (at 1-sigma) from 2790–1160 B.P. The dated cultural features are seven hearths, two burned rock mounds, one occupation zone, and one burned rock concentration. Five of the hearths were basin shaped, while two were generally flat. All but one (Feature 6 at 41CV1143) yielded charred macrobotanical remains from flotation samples (see Appendix E). Identified wood taxa from these hearths consist of oak (which was dominant), ash, hackberry, walnut, and the rose and willow families. The greatest variety of wood types was associated with two hearths at 41CV1049; each yielded four different types. Feature 2 at 41CV947 contained thin and thick nutshell fragments probably representing pecan and walnut, and Feature 2A at 41CV988 produced unidentifiable corm fragments. These remains indicate food gathering and processing. Flotation samples from three of the

**Table 83. Summary of radiocarbon-dated features at Paluxy sites**

Site	Feature Number	Feature Type	Depth <sup>1</sup>	Corrected Age (B.P.) <sup>2</sup>
41CV947	1	Occupation zone	10–32 cm	1370 ± 50
	2	Basin-shaped hearth	36–58 cm	1880 ± 40
41CV984	2	Burned rock mound	0–60 cm	2750 ± 40
41CV988	2A	Basin-shaped hearth	9–43 cm	1280 ± 40
	4	Basin-shaped hearth	19–41 cm	1230 ± 40
41CV1049	1A	Flat hearth	15–32 cm	1600 ± 100
	7	Basin-shaped hearth	30–75 cm	1590 ± 50
41CV1093	4	Burned rock mound	12–51 cm	1420 ± 40
41CV1106	4	Occupation zone	42–63 cm	390 ± 40
41CV1138	1	Basin-shaped hearth	29–38 cm	2460 ± 40
41CV1143	1A	Burned rock concentration	14–28 cm	1200 ± 40
	6	Flat hearth	24–43 cm	2210 ± 40

<sup>1</sup> Minimum and maximum depths based on all exposures of features.

<sup>2</sup> All radiocarbon dates are on charred wood.

other four feature types were submitted for macrobotanical analysis, and the burned rock mound at 41CV1093 yielded charred plant remains. Thus, both fuel and food resources are represented in this sample.

All 11 of the Late Archaic to transitional Late Prehistoric features predominantly contained burned rocks; however, 313 lithic artifacts were recovered from 9 feature contexts. These feature-associated materials consist of 304 flakes and 9 formal and expedient stone tools, including 1 Darl dart point (Table 84). Approximately 48 percent ( $n = 151$ ) of these artifacts occurred in the burned rock mound at 41CV984. Of the 141 feature-associated stone artifacts identified to a defined chert type, 88.3 percent were attributed to four different classes. In descending order, the identified types are Table Rock Flat (32.6 percent), Fort Hood Yellow (22.6 percent), Heiner Lake Tan (19.8 percent), and Heiner Lake Translucent Brown (13.3 percent). The only faunal remains associated with these features are four vertebrate fragments from a hearth at 41CV988.

At site 41CV1106, an occupation zone (Feature 4) composed primarily of burned rocks produced charcoal that was radiocarbon dated to  $390 \pm 40$  B.P., demonstrating utilization of this site during the Toyah phase of the Late Prehistoric period. Although the feature appears to be horizontally and vertically discrete, the cultural

observations are limited due to the paucity of associated artifacts (one late-stage/finished biface and one flake) and the absence of charred macrobotanical remains.

All eight Paluxy sites previously tested by Mariah were recommended as eligible for listing on the NRHP. Based on charcoal and snail shell radiocarbon assays from feature contexts, temporal assignments were made for prehistoric components at seven of the eight sites (Table 85). Excluding one date that was rejected because it was thought to be modern, 18 dates were obtained for nine features at seven sites.

The dated features spanned the Early Archaic period through the Austin phase of the Late Prehistoric period, from approximately 8500–650 B.P. (Quigg 1996:653–705). The depths of these cultural deposits range from 0–110 cm. Represented in these occupations are nine burned rock features consisting of two hearths, three mounds, and four middens.

The different feature types seem to correspond to specific time periods. Two hearths at 41CV478 produced radiocarbon ages equating to the Early Archaic period. Neither of these flat, slab-lined hearths produced cultural materials. The chronometric data indicate that all three mounds were initially used during the Middle Archaic period. Three radiocarbon ages for Feature 2 at 41CV594 suggest that this mound

Table 84. Cultural materials from Late Archaic and transitional Late Prehistoric feature contexts

Site	Feature Number	Darl Dart Point	Late-stage/ Finished Bifaces	Miscellaneous Biface	Miscellaneous Uniface	Multifunctional Tool	Edge-modified Flakes	Unmodified Debitage	Unmodified Bones	Totals
41CV947	1	-	-	-	-	-	-	2	-	2
	2	-	-	-	-	-	-	2	-	2
41CV984	2	-	3	1	-	-	1	146	-	151
41CV988	2A	1	-	-	-	-	-	78	4	83
	4	-	-	-	-	-	-	4	-	4
41CV1049	1A	-	-	-	-	1	-	18	-	19
	7	-	-	-	-	-	-	1	-	1
41CV1093	4	-	-	-	1	-	-	53	-	54
41CV1138	1	-	-	-	-	-	1	-	-	1
Totals		1	3	1	1	1	2	304	4	317

**Table 85. Summary of radiocarbon-dated features at Paluxy sites previously tested by Mariah Associates**

Site	Feature Number	Feature Type	Depth	Corrected Age (B.P.) <sup>1</sup>
41CV319	1	burned rock midden	0–110 cm	990 ± 50
41CV478	1	flat hearth	30–50 cm	4620 ± 50 (s)
	2	flat hearth	65–90 cm	5080 ± 60 (s)
41CV594				5160 ± 70 (s)
	2	burned rock mound	0–80 cm	1520 ± 70
	2	burned rock mound	10–55 cm	170 ± 70 <sup>2</sup>
				4350 ± 60
41CV595				4100 ± 70
	1	burned rock midden	10–110 cm	1240 ± 70 <sup>3</sup>
	2	burned rock midden	0–70 cm	920 ± 80 <sup>3</sup>
41CV1027				1860 ± 80
	1	burned rock mound	0–40 cm	4200 ± 80
				4370 ± 70
				4490 ± 60
	1	burned rock mound	0–50 cm	4360 ± 80
41CV1391	1 <sup>4</sup>	burned rock midden	5–40 cm	1030 ± 30
	1A <sup>4</sup>	burned rock midden	0–40 cm	1760 ± 100
41CV1403	1	burned rock mound	0–50 cm	3890 ± 80 (s)
				3290 ± 50 (s)

<sup>1</sup> All radiocarbon dates are on charred wood unless otherwise noted: (s) = snail date. Data are from Trierweiler (1996:Appendix F).

<sup>2</sup> Rejected date; considered modern.

<sup>3</sup> These dates are stratigraphically reversed.

<sup>4</sup> Features 1 and 1A were later interpreted as parts of the same midden.

experienced multiple use episodes over an extended period of time. A single Yarbrough point (from 41CV1027) is the only diagnostic artifact recovered from these mounds (Trierweiler, ed. 1994:233–236). The middens correlate to the Late Archaic and Late Prehistoric periods. At 41CV1391, Features 1 and 1A date to the Austin phase and Late Archaic period, respectively. Nonetheless, these two features were interpreted as representing different use episodes within a single contiguous midden deposit. Cultural materials associated with the middens consist of debitage, expedient and formal tools, and bones. Diagnostic artifacts include Scallorn, Darl, Castroville, and Montell points. None of the middens produced charred macrobotanical remains; however, an undated internal hearth (Feature 2) present near the base of the midden (Feature 1) at 41CV1391 contained charred oak wood.

## Discussion

A comparison of calibrated radiocarbon dates associated with burned rock features excavated by Mariah and Prewitt and Associates provides a reasonable evaluation of the chronology of cultural activities at Paluxy sites (Figure 151). Based on this sequence, temporal assignments for the dated features span 5,657 years and range (at 1-sigma) from 4032 B.C. to A.D. 1625.<sup>4</sup> A comparison of the calibrated dates with Collins's (1995) central Texas chronology indicates that the Paluxy environment was

<sup>4</sup>Since TRC Mariah used a different cultural chronology in previous studies, using the revised chronology of Collins (1995) in some cases changes the temporal period assignments of Paluxy sites that they excavated.



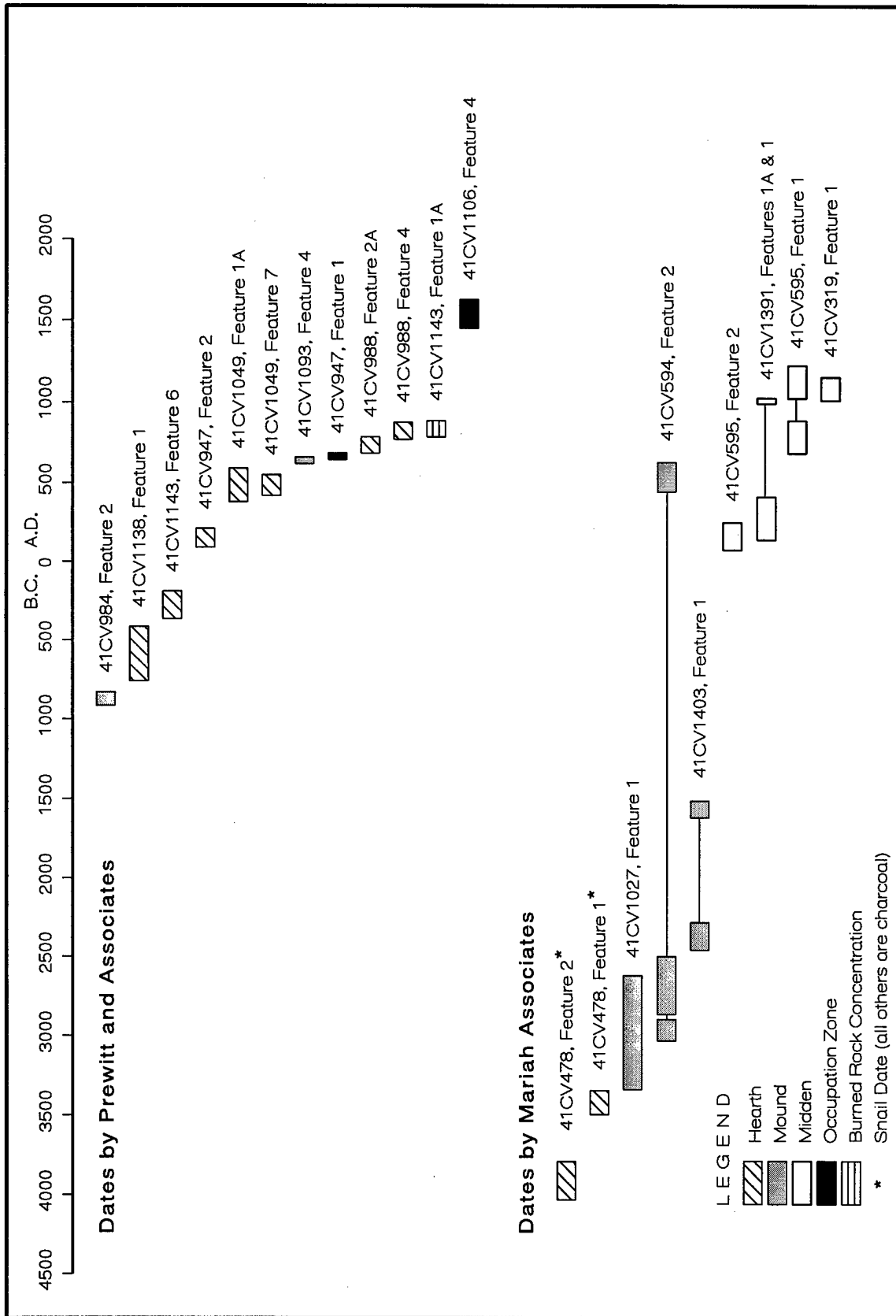


Figure 151. Comparison of calibrated radiocarbon dates on charcoal and snail shells from Paluxy site features.

repeatedly occupied from the Middle Archaic period through the Late Prehistoric period Toyah phase. Although all of the previously excavated mounds were in proximity to Paluxy-derived deposits, each was situated on an exposed bedrock upland, and none are actually encapsulated by Paluxy sediments. Therefore, the dates derived from these mounds cannot be definitely interpreted as evidence of utilization of the Paluxy environment during the Middle Archaic period, although it is likely that the people who created the mounds were exploiting resources in the Paluxy zone (see Chapter 5). Notably, the present study did identify two domed burned rock mounds that are buried in Paluxy deposits. Dates from the base of both of these mounds indicate that they began to accrete during the Late Archaic period. This is not to say that no cultural deposits buried in Paluxy sediments predate the Late Archaic period (e.g., the hearths at 41CV478), but older components should be very rare given the interpretations of site formation processes discussed in Chapter 5. To date, the archeological and geomorphic evidence demonstrates that the Paluxy environment was most intensively occupied during the Late Archaic period and the Austin phase of the Late Prehistoric period.

Outcrops of Paluxy sands constitute a very distinctive geomorphic formation within the overall landscape on Fort Hood. The high frequency of prehistoric sites at these locations suggests that the Paluxy environment was preferentially chosen, and Abbott (1994c, 1995c) advanced three hypotheses to explain the intentional selection of the Paluxy substrate as a habitation/activity locality by prehistoric peoples. He suggests that the Paluxy environment offered: (1) unique or concentrated flora that included a variety of food and/or fuel resources; (2) rapid drainage that created a more desirable living surface, especially during wet periods; and (3) a sandy matrix with naturally occurring gullies that made construction of subsurface features (i.e., digging of baking pits) easier. None of these explanations are mutually exclusive, and it is likely that all three are true to an extent. The present geomorphic investigations and macrobotanical analyses support the first proposition. Geomorphic evidence suggests that Paluxy sites were wooded areas rather than grasslands like the surrounding uplands (see Chapter 5), and macrobotanical studies demon-

strate the variety of wood taxa, in addition to nutshell and corm fragments, recovered from feature contexts (see Appendix E). Because they specifically occur in abundance on the Paluxy landforms, these resources would have been an important attraction.

Gemma Mehalchick, Project Archeologist, and Laura Sanchez, Senior Field Botanist at Fort Hood, visited the same four Paluxy sites (41CV947, 41CV984, 41CV988, and 41CV1049) on three different occasions during March, April, and May of 1997. The vegetation at each site was identified, with particular attention paid to searching for plants with underground storage roots (Table 86). No significant differences in observed plants were found between the sites, and all four seem to support nearly identical plant communities. With two exceptions, there did not seem to be any significant differences between the plant species observed growing in the Paluxy sand deposits and the plants growing in the thin soils overlying Walnut Clay bedrock upslope or the thin soils overlying Glen Rose bedrock downslope. The exception is that post oak and blackjack oak trees were abundant in the Paluxy sands but do not seem to grow on the surrounding slopes or upland. This effort was severely limited due to time constraints, but a more rigorous attempt at defining the plant communities might reveal that certain species are significantly more abundant in Paluxy settings than in surrounding areas. The importance of identifying and collecting edible plant species from Paluxy environments over a period of time for comparative analyses cannot be overstated. Such studies are essential if regional research goals include defining how and why Paluxy localities were utilized by prehistoric peoples.

Permeability tests indicate that Paluxy sediments consist of well drained soils (McCaleb 1985). This accounts for rapid drainage and helps substantiate the second hypothesis. The final hypothesis proposes that sandier soils and natural gullies would facilitate feature construction; however, the archeological data are inconclusive. Basin-shaped hearths present on some Paluxy sites indicate that the sediments were either excavated to contain the features or that the hearths were constructed inside natural depressions. Nonetheless, these features do not occur in any greater frequency in the Paluxy sands than in other depositional settings. To date, there is no evidence that any of the other types of

**Table 86. Summary of vascular plants identified at Paluxy sites during March, April, and May 1997**

Family Species	Common Names
<i>Acacia angustissima</i> var. <i>hirta</i>	fern acacia (shrub)
<i>Allium drummondii</i>	wild onion*
<i>Ambrosia cumanensis</i>	western ragweed
<i>Anemone berlandieri</i>	anemone
<i>Aphanostephus skirrhobasis</i>	lazy daisy
<i>Aristida purpurea</i>	threeawn (grass)
<i>Artemisia ludoviciana</i>	Louisiana sagewort
<i>Asclepias asperula</i>	milkweed
<i>Bothriochloa laguroides</i>	silver bluestem (grass)
<i>Bouteloua pectinata</i>	tall grama (grass)
<i>Buglossoides arvense</i>	buglossoides
<i>Bumelia lanuginosa</i>	coma (tree)
<i>Callirhoe digitata</i>	finger poppymallow*
<i>Calylophus berlandieri</i>	evening primrose
<i>Carex planostachys</i>	cedar sedge (sedge)
<i>Celtis laevigata</i>	sugar hackberry (tree)
<i>Cercis canadensis</i>	redbud (tree)
<i>Chaerophyllum tainturieri</i>	chervil
<i>Chaetopappa bellidifolia</i>	hairy leastdaisy
<i>Chamaecrista fasciculata</i>	partidge pea
<i>Ciclospermum leptophyllum</i>	slimlobe celery
<i>Cirsium terraenigrae</i>	thistle
<i>Cirsium texanum</i>	southern thistle
<i>Cnidoscolus texanus</i>	Texas bullnettle*
<i>Commelina erecta</i>	day flower
<i>Cornus drummondii</i>	rough-leaf dogwood (tree)
<i>Croton monanthogynus</i>	prairie tea
<i>Cyperus esculentus</i>	yellow nutgrass (sedge)*
<i>Daucus pusillus</i>	rattlesnakeweed
<i>Desmanthus illinoensis</i>	prickleweed
<i>Diospyros texana</i>	Mexican persimmon (shrub)
<i>Eragrostis intermedia</i>	plains lovegrass (grass)
<i>Eragrostis trichodes</i>	sand lovegrass (grass)
<i>Erigeron tenuis</i>	slender fleabane
<i>Erioneuron pilosum</i>	hairy tridens (grass)
<i>Erodium texanum</i>	Texas filaree
<i>Euphorbia roemeriana</i>	Roemer spurge
<i>Evax prolifera</i>	bighead evax
<i>Evolvulus nuttallianus</i>	hairy evolvulus
<i>Forestiera pubescens</i>	elbowbush
<i>Fraxinus texensis</i>	Texas ash
<i>Gaillardia pulchella</i>	Indian blanket
<i>Gaura coccinea</i>	scarlet gaura
<i>Geranium carolinianum</i>	Carolina geranium
<i>Grindelia lanceolata</i>	gulf gumweed
<i>Hedeoma acinoides</i>	slender mock pennyroyal
<i>Hedeoma drummondii</i>	Drummond mock pennyroyal
<i>Hedyotis nigricans</i>	bluet
<i>Hymenopappus scabiosaeus</i> var. <i>corymbosus</i>	old plainsman
<i>Ilex decidua</i>	deciduous holly (shrub)
<i>Indigofera miniata</i>	scarlet pea
<i>Ipomoea trichocarpa</i>	morning glory
<i>Juniperus ashei</i>	Ashe juniper (tree)
<i>Krameria lanceolata</i>	trailing ratany
<i>Lepidium virginicum</i>	pepperweed

Table 86, continued

Family Species	Common Names
<i>Leptochloa dubia</i>	green sprangletop (grass)
<i>Liatris mucronata</i>	gayfeather*
<i>Lindheimera texana</i>	Texas star
<i>Linum rigidum</i>	stiffstem flax
<i>Linum rupestre</i>	rock flax
<i>Lithospermum incisum</i>	narrowleaf puccoon
<i>Lonicera albiflora</i>	white honeysuckle (shrub)
<i>Lygodesmia texana</i>	Texas skeleton plant
<i>Mahonia trifoliolata</i>	agarito (shrub)
<i>Marshallia caespitosa</i>	Barbara's-buttons
<i>Matelea reticulata</i>	milkvine
<i>Melampodium leucanthum</i>	plains blackfoot
<i>Mimosa borealis</i>	pink mimosa (shrub)
<i>Monarda punctata</i>	spotted beebalm
<i>Neptunia lutea</i>	yellow neptunia
<i>Nolina erumpens</i>	beargrass (succulent)
<i>Nothoscordum bivalve</i>	crow poison*
<i>Oenothera laciniata</i>	cutleaf evening primrose*
<i>Opuntia lindheimeri</i> var. <i>lindheimeri</i>	Texas prickly pear (succulent)
<i>Oxalis dillenii</i>	Dillens oxalis
<i>Parthenocissus quinquefolia</i>	Virginia creeper
<i>Pediomelum rhombifolium</i>	roundleaf scurfpea
<i>Penstemon cobaea</i>	foxglove
<i>Phoradendron tomentosum</i>	Christmas mistletoe
<i>Phyllanthus polygonoides</i>	knotweed leaf flower
<i>Physalis viscosa</i>	ground cherry
<i>Plantago wrightiana</i>	wright plantain
<i>Polygala alba</i>	white milkwort
<i>Polytaenia nuttallii</i>	prairie parsley
<i>Prosopis glandulosa</i> var. <i>glandulosa</i>	honey mesquite (tree)
<i>Prunus mexicana</i>	Mexican plum (tree)
<i>Ptelea trifoliata</i> var. <i>trifoliata</i>	wafer ash
<i>Quercus buckleyi</i>	Texas red oak (tree)
<i>Quercus marilandica</i>	blackjack oak (tree)
<i>Quercus stellata</i> var. <i>stellata</i>	post oak (tree)
<i>Quercus virginiana</i>	live oak (tree)
<i>Ratibida columnifera</i>	Mexican hat
<i>Rhus aromatica</i>	fragrant sumac (tree)
<i>Rhus copallina</i>	flame leaf sumac (tree)
<i>Rubus trivialis</i>	dewberry
<i>Rudbeckia hirta</i>	brown-eyed susan
<i>Ruellia nudiflora</i>	ruellia
<i>Salvia texana</i>	sage
<i>Schizachyrium scoparium</i> var. <i>frequens</i>	litte bluestem (grass)
<i>Sisyrinchium ensigerum</i>	sword-leaf blue-eye grass
<i>Smilax rotundifolia</i>	common greenbrier*
<i>Solanum dimidiatum</i>	western horse nettle
<i>Sophora affinis</i>	Eve's Necklace (tree)
<i>Sporobolus asper</i> var. <i>asper</i>	tall dropseed (grass)
<i>Stillingia texana</i>	Texas stillingia
<i>Stipa leucotricha</i>	Texas wintergrass (grass)
<i>Symphoricarpos orbiculatus</i>	coralberry (shrub)
<i>Tetrameuris scaposa</i>	bitterweed
<i>Thelesperma simplicifolium</i>	slender greenthread
<i>Tridens albescens</i>	white tridens (grass)

Table 86, continued

Family Species	Common Names
<i>Ulmus crassifolia</i>	cedar elm (tree)
<i>Valerianella amarella</i>	hairy cornsalad
<i>Verbena bipinnatifida</i> var. <i>bipinnatifida</i>	Dakota vervain
<i>Verbesina virginica</i>	frostweed
<i>Viburnum rufidulum</i>	southern blackhaw (tree)
<i>Vicia ludoviciana</i>	deer pea vetch
<i>Vitis mustangensis</i>	mustang grape
<i>Yucca arkansana</i>	Arkansas yucca (succulent)
<i>Yucca reverchonii</i>	San Angelo yucca (succulent)
<i>Zanthoxylum hirsutum</i>	pricklyash (tree)

NOTE: Identification was made by Senior Field Botanist Laura Sanchez. Scientific names correspond with Hatch et al. 1990

\*Plants with potentially edible underground storage parts.

features were constructed in a way that incorporated naturally occurring gullies.

The recent excavations reveal relatively good preservation of charred plant remains in most feature contexts. The quality and quantity of preserved organic remains was initially surprising. It was originally thought that the sandy sediments were acidic, which would accelerate deterioration of organic materials. However, the *Soil Survey of Coryell County* (McCaleb 1985) reveals that the Cisco and Wise series consist of soils that are neutral or mildly to moderately alkaline. Such conditions are less deleterious to the preservation of perishable materials. While constant wetting and drying is not conducive to preservation of organic remains in sandy soils, the overall state of preservation is surprisingly good. The recovery of charred corm fragments (storage root material) from hearth fill at 41CV988 is evidence of the interpretability of Paluxy site samples. Phil Dering notes that the recovery of such remains "in a recognizable and potentially identifiable condition is a rare occurrence" (see Appendix E),

The intactness of the features is equally surprising given that many are shallowly buried and that disturbances are present at many of the sites. Although they have not yet been disturbed, these shallowly buried components at Paluxy sites are vulnerable. The most apparent impact is the ongoing military use of these areas. Particularly notable is the damage done by tracked vehicles and the subsequent erosion already sustained by these sites. The reality of this impending threat became strikingly apparent

at site 41CV988. After the test excavations were manually backfilled, a crew returned to the site to map it 23 days later. During the latter visit, fresh tank tracks were visible across the surface of Test Unit 1, where the shallowly buried but intact basin-shaped hearth that yielded the corm fragments had been located. The continuing impacts of military training activities are seriously and irrevocably destroying substantial data concerning prehistoric occupations in the Paluxy paleoenvironment.

#### HOUSE AND RIPSTEIN CREEK SITES

Of the four site groupings, the greatest number of sites ( $n = 15$ ) are situated along or adjacent to tributaries of House and Ripstein Creeks. The majority of these sites are located within a 2-km radius of the confluence of House and Ripstein Creeks, but a few are situated farther downstream along House Creek. A total of 28 analysis units are identified at these sites. When the non-Paluxy portions of sites 41CV1191 and 41CV1194 are included, there are 31 analysis units at 17 sites (Table 87).

Eighteen analysis units at 12 sites yielded sparse cultural materials rendering discrete components indistinguishable, and/or contained burned rock features that were diffuse or exhibited disturbance which compromised contextual integrity (see Chapters 6 and 7). These features included six burned rock concentrations (Feature 2 at 41CV1194; Feature 1 at 41CV1219; Features 3, 4, and 5 at 41CV1275; and Feature 3

Table 87. Summary of House and Ripstein Creek sites

Site	Location	Geomorphic Setting	Analysis Unit	Temporal/Cultural Periods	BHTs	Subsurface Testing TUs
41CV578	House Creek	T <sub>1</sub>	1	Late Archaic	1	1
41CV1191*	Ripstein Creek	T <sub>1</sub>	2	Middle Archaic	3	2
		colluvial wedge	3	probably Late Archaic**	1	1
41CV1194*	Ripstein Creek	Cts/T <sub>1</sub>	1	Late Archaic/Late Prehistoric (Austin phase)		3
41CV1211	House Creek	Cts/T <sub>1</sub>	2	Late Archaic		2
		T <sub>1</sub>	2	Middle Archaic***	1	1
41CV1218	House Creek	T <sub>0</sub>	1	none defined	3	3
41CV1219	House Creek	T <sub>1</sub>	2	none defined	2	1
41CV1221	House Creek	T <sub>2</sub>	1	none defined	2	1
		T <sub>1</sub>	1	none defined	9	4
		T <sub>0</sub> /T <sub>1</sub>	1	none defined	3	2
		T <sub>2</sub>	2	none defined		3
41CV1222	House and Ripstein Creeks	T <sub>0</sub>	1	none defined	4	3
41CV1225		T <sub>1</sub>	2	none defined	2	2
41CV1235	House Creek	T <sub>1</sub>	1	none defined	5	3
		Cts/T <sub>1</sub>	1	Late Archaic	2	4
41CV1250	House Creek	Cts/T <sub>1</sub>	2	Middle Archaic	2	3
41CV1269	House Creek	T <sub>1b</sub>	1	Late Prehistoric (Toyah phase)	3	2
		T <sub>1b</sub>	2	Late Prehistoric (Austin phase)	3	2
		Cts/T <sub>1</sub>	1	Late Archaic	1	2
41CV1275	House Creek	Cts/T <sub>1</sub>	2	Middle Archaic	2	2
		slope/bench	3	Late Archaic/Late Prehistoric (Austin phase)	2	1
		T <sub>1</sub>	1	none defined	6	3
		T <sub>1</sub>	2	none defined	1	1
		T <sub>1</sub>	3	Late Archaic	3	3
		T <sub>1</sub>	4	none defined	1	6
		T <sub>1</sub>	1	none defined	4	6
41CV1282	House Creek	Cts	1	none defined	1	1
41CV1286	House Creek	T <sub>1</sub>	2	Late Prehistoric (Toyah phase)		10
41CV1287		Cts/T <sub>1</sub> /bench/slope	1	none defined	6	6
41CV1308	Ripstein Creek	T <sub>1</sub>	1	none defined	1	1
	House Creek					

\* This site consists primarily of cultural deposits in Paluxy sediments (see Chapter 6), but only the archeological remains in non-Paluxy contexts are summarized here.

\*\* No chronometric data.

\*\*\* Lacks integrity.

at 41CV1287); two middens (Feature 1 at 41CV1221 and Feature 2 at 41CV1286); one hearth (Feature 4 at 41CV1282); and one mound (Feature 1 at 41CV1287). Although Feature 2 at 41CV1194 yielded a calibrated date of 2875–2790, 2780–2605 B.C., the feature's contextual integrity is severely compromised by scouring.

Thirteen analysis units at six sites—41CV578, 41CV1191, 41CV1235, 41CV1250, 41CV1269, and 41CV1286—yielded evidence of separable cultural components; however, temporal assignments based on chronometric data were possible for only 12 of the analysis units. The prehistoric occupations at sites on House and Ripstein Creeks span from the Middle Archaic period through the Toyah phase of the Late Prehistoric period.

### Geomorphic Observations

The House and Ripstein Creek sites are situated within the ca. 180-km<sup>2</sup> drainage basin of House Creek, a tributary of Cowhouse Creek. House Creek is an intermittent, partly braided stream channel (Nordt 1992:35). House Creek and its tributary Ripstein Creek incise the Glen Rose limestone. Low-order tributaries throughout the drainage basin cut across the Walnut (Killeen surface) and in some areas the Paluxy formations. A few of the low-order tributaries drain the small, isolated remnants of the Manning surface (Edwards and Comanche Peak limestones), such as Anderson Mountain, in the headwaters of the basin. While most of these sites are situated in alluvial valleys, portions of some sites (e.g., 41CV1269 and 41CV1287) rest on the slopes and uplands of the Walnut Formation, where cultural materials are buried in thin gravelly colluvial mantles.

Within the larger stream valleys throughout the drainage basin, late Pleistocene through late Holocene alluvial deposits are preserved in the form of three landforms— $T_2$ ,  $T_1$ , and  $T_0$  (Nordt 1992:35–39). Colluvial deposits interfinger with these alluvial deposits along the valley walls.

The  $T_2$  terrace, the highest and oldest alluvial terrace in the House Creek drainage basin, is correlated with the late Pleistocene Jackson alluvium (Nordt 1992:35). The  $T_2$  terraces are usually eroded and beveled, grading gradually onto the lower terrace surface. Two  $T_2$  terrace localities were investigated. The  $T_2$

surface at 41CV1218 is eroded and capped by late Holocene West Range alluvium. At 41CV1221, the  $T_2$  consists of a thin mantle of alluvium atop a limestone strath terrace.

The  $T_1$  terrace in some localities is subdivided into  $T_{1a}$  and  $T_{1b}$  components. However, the late Holocene alluvial deposits at most of the sites aggraded to the same elevation as the Fort Hood alluvium, and therefore  $T_1$  cannot be subdivided. The  $T_{1a}$  terrace component is comprised of the Georgetown and Fort Hood alluvium (Nordt 1992:35, 39). The late Pleistocene to early Holocene Georgetown alluvium was observed in backhoe trenches at 41CV1250, 41CV1275, and 41CV1286. Along the upper end of House Creek, where the channel is straight and its gradient is high, a poorly sorted, very gravelly Georgetown alluvium was observed resting on a 1–2-m-high strath terrace in the western part of 41CV1275. These gravelly deposits are atypical of the Georgetown alluvium, but it is not surprising that these deposits are poorly sorted given the steep valley slopes and headwater location of the deposits.

Approximately 1.5 km downstream from this locality, the House Creek valley widens and the channel starts to meander. In this area (i.e., the eastern half of 41CV1275 and at 41CV1286), the Georgetown alluvium consists of better-sorted deposits characterized by silty and loamy fills with diffuse gravels and a few thin gravel beds. The truncated Royalty paleosol was observed in trenches at depths of 143–210 cm below the  $T_1$  surface. Humates from bulk soil and sediment samples yielded conventional radiocarbon ages of  $9550 \pm 50$  and  $11,170 \pm 50$  B.P., respectively. Similar types of Georgetown alluvial deposits were observed buried below the  $T_{1a}$  surface farther downstream at site 41CV1250. These deposits are more typical of the Georgetown alluvium described by Nordt (1992), representing a fine-grained meanderbelt system facilitated by a steady and reliable base flow. Nordt et al. (1994) have interpreted climatic conditions during this period to be cool and mesic yet in a steady transition toward the warmer and drier conditions of the middle Holocene. The  $\delta^{13}C$  values (–22.2 and –20.3 ‰) obtained from the Royalty paleosol concur with this interpretation, suggesting a  $C_3$ -dominated floral community was in place.

The Fort Hood alluvium overlies the Georgetown and is exposed across the  $T_{1a}$  terrace tread or the distal portion of the  $T_1$  tread. Fort

Hood alluvium was observed at sites 41CV1275 (eastern half), 41CV1286, 41CV1250, 41CV1235, 41CV1225, and 41CV578. Buried Fort Hood deposits were observed interfingering with early to middle Holocene gravelly colluvium along the valley margins. The Fort Hood alluvium is typically light yellowish brown to yellowish brown and loamy. Gravelly facies were rarely observed.

Laterally inset to the Fort Hood alluvium is the lower West Range alluvium, although at 41CV1275 the Fort Hood alluvium was stripped away and the lower West Range rests unconformably on the Georgetown alluvium in many places. At site 41CV1250 and the western part of 41CV1275, the lower West Range is surficially exposed on the  $T_{1b}$  terrace surface. At all other sites investigated, the  $T_1$  terrace is not subdivided into  $T_{1a}$  and  $T_{1b}$  components, and the lower West Range is subaerially expressed on the  $T_1$  tread. Subaerial exposure of the lower West Range member is primarily due to the great vertical relief between channel fill and overbank facies, as the overbank deposits are rarely buried by subsequent alluvial fills. At 41CV1286, discrete beds of lower West Range alluvium interfinger with late Holocene-age colluvium on more-distal portions of the  $T_1$  terrace. Along the western end of 41CV1275, gravelly colluvial and lower West Range sediments are mixed and are not preserved as discrete beds. Throughout the upper portion of the House Creek valley (i.e., in the vicinity of sites 41CV1286 and 41CV1269), the lower West Range alluvial deposits are buried by colluvial deposits along the valley walls.

Five radiocarbon ages were obtained on West Range sediments and soils. A deeply buried A horizon (230–267+ cm) at 41CV1286 yielded a conventional radiocarbon age of  $3720 \pm 70$  B.P. Three other radiocarbon ages concur with Nordt's (1992:66) suggestion that lower West Range deposition continued later in time in the small and intermediate streams than in the trunk streams of Fort Hood. This he relates to the smaller size of the drainage basins. On the western part of 41CV1275, a buried A horizon imprinted on a gravelly channel fill facies yielded a conventional radiocarbon age of  $2060 \pm 80$  B.P. Humates from an associated overbank deposit at the same site yielded a conventional radiocarbon age of  $1980 \pm 40$  B.P. Downstream at 41CV1308, a buried A horizon yielded a conventional radiocarbon age of  $1510 \pm 80$  B.P. The fifth sample, obtained at 41CV1275 from an A horizon buried

by subsequent Ford alluviation, yielded a conventional radiocarbon age of  $910 \pm 60$  B.P. Its loamy texture and radiocarbon age suggest that the buried A horizon is imprinted on a relatively thin upper West Range deposit.

The upper West Range alluvial member was not identified by Nordt (1992:39) in the House Creek valley, although he states it may be preserved there in small buried remnants. The current investigations within the House Creek valley substantiate this conclusion, as the lower West Range member was observed throughout the valley, while the upper member was observed only at two other localities. These localities (at 41CV578 and 41CV1250) are at tributary confluences, which may facilitate the accumulation of slackwater deposits during flood events as floodwaters are backed up into the mouths of the tributaries. Relatively thick deposits of upper West Range alluvium were observed buried by subsequent Ford sedimentation.

The  $\delta^{13}C$  values accompanying the radiocarbon assays on sediments are noteworthy. The highest value,  $-15.7$  ‰, is associated with the latest date of  $910 \pm 60$  B.P., while values for the three earlier radiocarbon ages range from  $-20.6$  to  $-18.2$  ‰. These values suggest that the percentage of  $C_4$  plants on the floodplain of House Creek dramatically increased between ca. 2000 and 900 B.P. Assuming that a  $+3.5$  ‰ enrichment in  $^{13}C$  occurs due to the microbial decomposition of organic materials in soils (see Dzurec et al. 1985:18; Natelhoffer and Fry 1988:1635),  $C_4$  plants increased from ca. 21–38 to 56 percent of the biomass during the first millennium. Nordt et al. (1994) also note an increase in  $C_4$  vegetation at Fort Hood during this time and interpret the increase as a response to the onset of warm and dry climatic conditions. At around the same time, floodplain stabilization and pedogenesis occurred throughout the stream valleys at Fort Hood. Nordt (1995) notes the contemporaneity of the stabilization of the floodplain and subsequent cumelic soil development (Tanktrail paleosol) topping West Range deposits in the Henson Creek valley. Charcoal obtained from the base of the soil yielded a conventional radiocarbon assay of  $1300 \pm 80$  B.P. In the Leon River valley, Mehalchick et al. (1999) documented a buried cumelic soil, the Leon River paleosol, formed on the West Range alluvium ca. 1100–1000 B.P. The fact that flood stabilization, pedogenesis, and accompanying increases in  $C_4$



vegetation occurred throughout Fort Hood suggests a regionwide shift in climatic conditions may be responsible. A shift to more-arid conditions throughout the Southern Plains at ca. 1000 B.P. is proposed by Hall (1982, 1990) based on his observations of stream channel entrenchment throughout the region. Other lines of evidence pointing to a regionwide climatic shift to more-xeric conditions around 1,000 years ago are documented by Blum and Valastro (1989), Frederick (1994), Holliday (1985), and Kibler (1994).

An ensuing period of deposition, from ca. 600 B.P. to the present, is represented by the Ford alluvium. The Ford alluvium is preserved throughout the valley and is laterally inset to the lower West Range in the form of the  $T_0$  terrace or occurs as thin drapes on the  $T_1$  terraces. The late Holocene alluvium typically consists of dark loams and dark gravelly loams.

### **Cultural Observations**

Eighteen features and two spatially discrete "living surfaces" comprise the dated archeological deposits at the six significant sites. Sites 41CV578, 41CV1235, and 41CV1269 each encompass an analysis unit that corresponds to the Middle Archaic period. Yielding calibrated dates from 3650–2015 B.C., these features include four basin-shaped hearths, two burned rock concentrations, and an occupation zone. All of the features consist mainly of burned rocks. Two hearths (Features 5 and 7) at 41CV578 and one (Feature 7) at 41CV1235 produced 1 unmodified mussel shell and 5 flakes, but did not yield charred plant remains. In contrast, the hearth (Feature 3) at 41CV1269 contained moderate amounts of lithic artifacts and bone fragments, including a deer humerus. Fuel resources are represented by charred oak and juniper wood. Lithic artifacts were recovered from the two burned rock concentrations. Feature 1 at 41CV1235 only yielded a Pedernales point, while Feature 5 at 41CV1269 produced two bifaces, a mano/hammerstone, and debitage. The occupation zone (Feature 5 at 41CV1235) produced the greatest number and diversity of cultural materials. The assemblage includes bone fragments, a mussel shell, debitage, and 12 formal and expedient tools.

In general, the faunal materials indicate a reliance on an aquatic resource (i.e., mussels)

and hunting. Although the macrobotanical remains consist solely of woods used as fuel, the presence of ground stone suggests that gathering and processing of edible plants occurred. Although the chipped stone artifacts include small percentages of several identifiable chert types, Anderson Mountain Gray is the dominant type (20.9 percent of the assemblages).

Chronometric data and diagnostic projectile points indicate that two burned rock middens accreted during the end of the Middle Archaic period and/or the transition to the Late Archaic period. Middens at 41CV1235 and 41CV1269 (both designated as Feature 1) each have a maximum thickness of 70 cm, with calibrated dates of 2400–2205 B.C. and 2135–1975 B.C. obtained on charcoal from the base of each feature, respectively. Associated with these dates are charred macrobotanical remains of oak and willow wood. Although a clear stratigraphic boundary is not visible within either midden deposit, the excavation results suggest that one may exist. At 41CV1235, Montell and Pedernales points were recovered from 20–42 cm, in addition to a Provisional Type I point from 60–70 cm. Several Late Archaic dart points were collected from the backdirt of a trench excavated through the midden at 41CV1269, and the probability that they are from the midden deposit is high. In addition, one in situ Pedernales point was recovered from the stratigraphic center of the midden deposit. All of this evidence suggests that these middens experienced multiple use episodes and continued to be used well into the Late Archaic period. These middens also yielded numerous formal and expedient tools, debitage, bones (including bison, rabbit, and deer), a mano, a hammerstone, and a ground piece of hematite. This assemblage indicates a variety of activities which includes hunting, plant gathering and processing, lithic reduction, and the use of pigment for ornamental purposes. Numerous chert types are represented in small percentages in the chipped stone assemblage, but Heiner Lake Tan and Anderson Mountain Gray comprise approximately 17 percent of the collection.

Calibrated dates ranging from 1510 B.C.–A.D. 635 demonstrate that features at sites 41CV578, 41CV1191, 41CV1235, and 41CV1269 correlate to the Late Archaic period. These discrete features consist of two flat hearths (Feature 9 at 41CV578 and Feature 4 at 41CV1235), a burned rock midden (Feature 1 at 41CV1191), and a

basin-shaped hearth (Feature 6) encountered at the base of a midden (Feature 2) at 41CV1269. All three hearths produced charred oak wood. In addition, Feature 4 yielded thin nutshell fragments, whereas Feature 9 contained charred elm wood, pecan and thick nutshell fragments, and fruit fragments. Interestingly, no artifacts were recovered directly from Feature 9, and the surrounding matrix produced few cultural materials. Cultural materials found in the other two hearths consisted of formal and expedient lithic tools, ground stone, dense amounts of debitage, and bones (including deer and pronghorn/deer). The differences in the cultural assemblages are probably related to feature function(s). The 48-cm-thick midden at 41CV1191 produced debitage, two lithic tools, and a metate. In addition, a Pedernales point was recovered stratigraphically above a Provisional Type I point; however, a calibrated date of 1510–1415 B.C. was obtained on charcoal from below both dart points near the base of the midden.

At 41CV1269, scattered burned rocks, expedient and formal tools, debitage, and bones indicative of several living surfaces were recovered from 80–120-cm-thick late Holocene colluvial deposits. A calibrated radiocarbon age of 785–540 B.C. and a recycled Castroville point suggest that these deposits represent multiple Late Archaic occupations. In general, the faunal and macrobotanical remains, along with the presence of ground stone reveal hunting, gathering, and processing activities. Heiner Lake Tan, Heiner Lake Blue, Anderson Mountain Gray, and Table Rock Flat account for approximately one-third of the chipped stone artifacts.

A basin-shaped hearth (Feature 2) at 41CV1191 yielded a calibrated date of A.D. 405–450, indicating utilization during the transition from the Late Archaic period to the Late Prehistoric period (Austin phase). The feature contained debitage, expedient tools, ground stone, and charred wood (type indeterminate). About 14 percent of the chipped stone artifacts are typed as Table Rock Flat. Although no edible plant remains were present, mano and metate fragments suggest gathering and processing.

Two basin hearths (ca. A.D. 780–980) and a burned rock midden (A.D. 1270–1300) correspond to the Late Prehistoric period Austin phase. At 41CV1250, Features 5 and 7 (hearths) produced sparse debitage and a uniface. Feature 5 also

contained charred oak and willow wood, and thin and thick nutshell fragments. Feature 2 (midden) at 41CV1269 is approximately 55-cm-thick and produced a high frequency of chipped stone artifacts, in addition to mussel shells, bones, a piece of ground hematite, and charred oak, juniper, and willow wood. The dominant chert types associated with these features are, in descending order, Table Rock Flat, Heiner Lake Tan, and Anderson Mountain Gray. Although this midden had an internal hearth (Feature 6, see above) near its base that dates to the Late Archaic period, a calibrated radiocarbon date of A.D. 1270–1300 from the upper portion of the midden demonstrates utilization during the Austin phase. The only diagnostic artifact is a Castroville point from the middle of the feature. Thus, it appears that the midden at 41CV1269 began to accumulate during the latter half of the Late Archaic period and continued in use for ca. 2,000 years.

Cultural components correlating to the Toyah phase of the Late Prehistoric period were encountered at 41CV1250 and 41CV1286. Feature 4 (an occupation zone) at 41CV1250 yielded dense quantities of burned rocks and chipped stone artifacts, in addition to mussel shells, bones, and ground hematite. Numerous chert types are represented, with Heiner Lake Tan (13 percent) and Fort Hood Yellow (7.5 percent) being dominant. Two of the mussel shells are cut and one is perforated, probably demonstrating modification for ornamental purposes along with the modified hematite. Identified faunal remains included rabbit, toad, deer, and pronghorn/deer. Charcoal from this occupation zone yielded a calibrated date of A.D. 1310–1415; a Scallorn point was recovered at about the same depth, and a Perdiz point was recovered from a higher elevation. This evidence suggests that the Scallorn point represents an old tool collected for reuse by later peoples. Representing fuel sources, the feature also produced wood charcoal of oak, hackberry, elm, and willow.

Site 41CV1286 contains a spatially discrete living surface which yielded a calibrated radiocarbon age of A.D. 1435–1470. Combining the results of past and present investigations, the unique assemblage consists of 41 flakes, 30 chipped stone tools, a piece of ground schist (nonlocal), and sparse burned rocks. The majority of the 30 tools are various types of scrapers ( $n = 15$ ) and edge-modified flakes ( $n = 13$ ), indicating that this

site represents a specialized activity locality possibly related to processing of bison hides. Although no bones were recovered, this is presumably due to poor preservation. Forty (56.3 percent) of the 71 chipped stone specimens are typed as Anderson Mountain Gray.

### Discussion

Along House and Ripstein Creeks and their tributaries, a body of sites provides evidence of intensive occupation from the Middle Archaic period through the Late Prehistoric period. Dated features and living surfaces represent occupations/activities between 3650 B.C.–A.D. 1470 for this site group. The presence of bones associated with sites from each time period indicates that hunting was an important activity. The majority of the identified faunal remains reveal a reliance on small to medium-sized game. Ground stone and/or charred nutshells recovered from Middle Archaic and Late Archaic components suggest exploitation of floral resources. The absence of ground stone and nutshells associated with the Late Prehistoric period could indicate a lesser reliance on these food items, but the samples are so small that this inference is questionable. Modified hematite and mussel shells are clearly used as ornaments during the Austin and Toyah phases. Ground hematite found in a Middle to Late Archaic midden suggests use of this pigment in earlier times.

Evidence of multiple use episodes spanning at least two millennia occurs within the three burned rock middens. Although stratigraphic boundaries within these features are not visually

apparent, they can provide substantial information about the processes affecting midden development and formation over thousands of years.

Anderson Mountain Gray and Heiner Lake Tan are the dominant chert types in this sample of House and Ripstein Creek sites. The high frequency of Anderson Mountain Gray is not surprising given the close proximity of the primary source (i.e., Anderson Mountain) to these sites. In addition, past investigations (Frederick and Ringstaff 1994:125–181) and the present study (see Chapter 11) demonstrate that Anderson Mountain Gray occurs in secondary contexts along House Creek. The current inquiries (see Chapter 11) concerning the distribution of the Southeast Range chert types, especially the Heiner Lake varieties, also are of interest. It has been demonstrated that nodules of Heiner Lake Blue occur in secondary contexts along House Creek. Although similar evidence does not presently exist for Heiner Lake Tan, this chert type may have a greater range than previously recognized and may occur naturally somewhere in west Fort Hood or farther west outside the base.

### COWHOUSE, TABLE ROCK, AND COTTONWOOD CREEK SITES

This group subsumes eight sites located within a 3-km radius of the confluences of Table Rock and Cottonwood Creeks with Cowhouse Creek. Ten analysis units are identified at these eight sites (Table 88).

Three analysis units (Analysis Unit 1 at 41CV1012, Analysis Unit 1 at 41CV1030, and

**Table 88. Summary of Cowhouse, Table Rock, and Cottonwood Creek sites**

Site	Location	Geomorphic Setting	Analysis Unit	Temporal/Cultural Unit	Subsurface Testing	
					BHTs	TUs
41CV1012	Cottonwood	slope	1	unknown	–	2
41CV1030	Cowhouse	T <sub>1</sub>	1	unknown	11	5
		T <sub>0</sub>	2	Historic	4	5
41CV1048	Cottonwood	Cts/T <sub>1</sub>	1	Middle Archaic	2	3
41CV1120	Table Rock	T <sub>1</sub>	1	Late Archaic	4	3
41CV1122	Table Rock	Cts/T <sub>1</sub>	1	Late Archaic	3	3
		T <sub>1</sub>	2	Middle Archaic	2	2
41CV1133	Table Rock	T <sub>1</sub>	1	Late Archaic-Late Prehistoric	4	4
41CV1137	Table Rock	T <sub>1</sub>	1	unknown	2	1
41CV1206	Cowhouse	Cts/T <sub>1</sub>	1	Middle Archaic	3	3

Analysis Unit 1 at 41CV1137) do not contain intact cultural deposits and are characterized by a paucity of cultural materials. Although two associated burned rock concentrations (Features 1 and 2) were encountered in Analysis Unit 2 at 41CV1030, both were diffuse and produced no prehistoric artifacts. Charred hackberry wood obtained from Feature 2 yielded a calibrated date of A.D. 1665–1950, but the integrity and origins of this burned rock feature are dubious.

A total of six analysis units at five sites (41CV1048, 41CV1120, 41CV1122, 41CV1133, and 41CV1206) produced evidence of spatially and stratigraphically discrete cultural occupations. These analysis units include dated features that span from the Middle Archaic period through the Austin phase of the Late Prehistoric period.

### Geomorphic Observations

The eight Cowhouse-Table Rock-Cottonwood Creek sites are located within the ca. 1,520-km<sup>2</sup> upper drainage basin of Cowhouse Creek (i.e., the area upstream from the mouth of House Creek). Cowhouse Creek is a perennial meandering to straight stream (Nordt 1992), while Table Rock and Cottonwood Creeks are intermittent tributaries of Cowhouse. These main drainages are incised into the Glen Rose limestone, while low-order tributaries in this basin cut across the Walnut (Killeen surface) and in some areas the Paluxy formations. A few small tributaries also drain the nearby isolated remnants of the Manning surface (Edwards and Comanche Peak limestones), which are preserved in the headwater areas of the basin. Surprisingly, these small ephemeral to intermittent drainages, such as those comprising the upper reaches of Cottonwood Creek, sometimes contain deposits predating the late Holocene. Based on radiocarbon assays from buried cultural features at 41CV1048 along Cottonwood Creek and 41CV1206 along an unnamed tributary of Cowhouse, these tributaries may contain preserved alluvial deposits equivalent to Nordt's (1992) Fort Hood alluvium. It is apparent that while much of the small tributary valley in the vicinity of 41CV1206 was scoured following the interval of Fort Hood deposition, deposits predating this scouring episode may be preserved along the valley margins under thick late Holocene colluvial deposits. However, the

majority of the fill in these small valleys dates to the late Holocene and is equivalent to Nordt's (1992) West Range and Ford alluvial units. At 41CV1012 along Cottonwood Creek, dark brown clayey West Range alluvium is preserved as a 60-cm drape on a 2–3-m-high strath terrace. Gravelly channel bars are present downstream from 41CV1012, and a larger volume of alluvium, in the form of a T<sub>1</sub> terrace, is preserved in the valley. At 41CV1048, dark gravelly loams of West Range age overlie deposits of Fort Hood alluvium. Preserved alluvium in the form of a T<sub>1</sub> terrace of 41CV1206 consists of the Ford, upper West Range, and Fort Hood units. The gravelly texture of these upper West Range deposits is not typical of the upper West Range alluvium in larger stream valleys. Given the location of 41CV1206, in the periphery of the basin, it is not surprising that the sorting of clasts is incomplete. This suggests that the typical fine-grained upper West Range deposits in the larger stream valleys grade into more-gravelly facies in the low-order tributaries. The apparent absence of deposits equivalent to the lower West Range in this low-order tributary valley also is noteworthy. It may be that the competence level of the smaller, high-gradient low-order tributaries was great enough to flush their valleys and transport large gravelly bedloads to the trunk streams during the interval of lower West Range deposition. A conventional radiocarbon age of 1140 ± 60 B.P. was obtained on a buried A horizon formed in the interbedded dark loamy and gravelly alluvium at 41CV1206. As stated earlier, floodplain stabilization and pedogenesis is seen throughout other larger stream valleys at Fort Hood at around this same time. The fact that floodplain stabilization and pedogenesis occurred throughout Fort Hood in low-order tributaries and major trunk streams indicates that a region-wide shift in climatic conditions may be responsible. Supporting this notion, the  $\delta^{13}\text{C}$  value of –13.8 ‰ from the ca. 1,140-year-old buried A horizon at 41CV1206 suggests that the floodplain of this small tributary supported a floral community dominated by C<sub>4</sub> plants (ca. 70 percent).

In the larger tributaries within the Cowhouse, Table Rock, and Cottonwood Creek basins, alluvial deposits from the late Pleistocene through the late Holocene are preserved. The oldest preserved deposits were observed at site 41CV1137 on Table Rock Creek. Below the T<sub>1a</sub> terrace surface, early to middle Holocene Fort

Hood alluvium overlies the late Pleistocene to early Holocene Georgetown alluvium. This sequence is consistent with the stratigraphy described by Nordt (1992:27) for the  $T_{1a}$  terrace fills of Table Rock Creek. The Fort Hood alluvium at this locality is characteristic of the second of two channel types described for the Fort Hood deposits in Table Rock Creek by Nordt (1992:27–28). The stacked fine-grained channel fills overlain by clayey and loamy sediments are representative of transitional braided-meandering stream channels. The Georgetown alluvial deposits are typical of a meandering fluvial system with fine-grained point bars. The Georgetown deposits are truncated, and very little of the Royalty paleosol, which caps the Georgetown alluvium throughout Fort Hood's stream valleys, is present along Table Rock Creek.

Downstream from 41CV1137, three other  $T_{1a}$  terrace localities were examined. The Fort Hood alluvial deposits observed at sites 41CV1120, 41CV1122, and 41CV1133 are more characteristic of a braided fluvial system, with stacked gravelly channel fills and loamy channel fills with diffuse gravels. At 41CV1133, the Fort Hood alluvium is subaerially exposed, but it is buried by West Range alluvium at sites 41CV1120 and 41CV1122 (where the late Holocene deposits are draped along the edge of the  $T_{1a}$  terrace). At 41CV1120, a buried soil atop the Fort Hood alluvium yielded a conventional radiocarbon age of  $4790 \pm 80$  B.P. The fine-grained, loamy textures of the West Range deposits are characteristic of its upper member, which underlies the  $T_{1b}$  terrace surface and drapes the edge of the  $T_{1a}$  surface within the Table Rock Creek valley (Nordt 1992:28). Although the textures of these deposits suggest that they represent the upper West Range member, radiocarbon assays from cultural features and temporally diagnostic artifacts suggest that portions of the deposit date to the period of lower West Range deposition.

Site 41CV1030, located along the main trunk of Cowhouse Creek, is situated on the  $T_1$  and  $T_0$  terraces. The  $T_1$  terrace tread along Cowhouse is typically diachronic as the Fort Hood and West Range alluvial units are surficially exposed. However, this site is located only along the edge of the  $T_1$  terrace, which is underlain by a very thick ( $>3.5$  m) unit of upper West Range alluvium. Based on the observed soil profiles, the upper West Range alluvium aggraded rapidly through fine-grained overbank deposition. The

$T_0$  terrace is laterally inset to the  $T_1$  and is composed of Ford alluvium. The Ford deposits are very thick ( $>3.5$  m) and imprinted with several soils.

### Cultural Observations

Chronometric data were obtained from 11 features at the five significant sites. The features include 4 middens, 3 burned rock concentrations, and 3 hearths, with all but 1 hearth dating to either the Middle or Late Archaic period.

Analysis units at sites 41CV1048, 41CV1122, and 41CV1206 correspond to the Middle Archaic period. These components include a burned rock midden, a burned rock concentration, and three basin-shaped hearths, all of which produced dense amounts of burned rocks. At 41CV1048, Feature 1 is a 50-cm-thick midden deposit that yielded a calibrated date of 2470–2325 B.C. on charcoal from near its base. Indeterminate charred wood and 3 flakes were found in the feature fill. This sparse recovery is atypical when compared to the majority of formally tested middens at Fort Hood. At 41CV1122, calibrated dates of 3960–3800 B.C. and 2870–2595 B.C. were obtained from Feature 4 (hearth) and Feature 5 (burned rock concentration), respectively. Sparse lithic artifacts, mussel shells, and bones were present in the hearth fill, and similar artifact types (excluding bones) were recovered from the burned rock concentration. In addition, Feature 4 contained charred oak and willow wood representing fuel. Both features yielded only 19 stone artifacts, with Heiner Lake Tan comprising the principal chert type (21 percent). Two superimposed hearths (Features 2 and 3) at 41CV1206 yielded calibrated dates of 2865–2580 B.C. and 2865–2585 B.C. Although the dates are virtually identical, partial stratigraphic separation and the morphology of the features indicate that these hearths represent separate use episodes. Feature 3 produced 2 flakes and indeterminate wood charcoal.

Two burned rock concentrations and three middens at three sites are assigned to the Late Archaic period. Feature 2 at 41CV1120 and Feature 3 at 41CV1122 are burned rock concentrations that produced calibrated dates of 1400–1265 B.C. and 1895–1760 B.C., respectively. The former contained charred oak wood, sparse debitage, and a few mussel shells, whereas the latter produced a greater amount of lithic artifacts and a bone fragment. Several chert types are

represented in the chipped stone artifacts, but Table Rock Flat accounts for 11.1 percent of the assemblage. At 41CV1122, Features 1 and 2 (middens) have maximum thicknesses of 40 and 44 cm, respectively. Chronometric data, obtained near the base of each midden, span from 1390–1145 B.C. Located on the colluvial toeslope, Feature 1 produced some debitage and a few bones. Feature 2, buried in the Holocene terrace, generated a high frequency of lithic artifacts including a Pedernales point, several mussel shells, and indeterminate wood charcoal. Slightly more than one-fourth of the chipped stones are typed as Table Rock Flat, Heiner Lake Tan, and Heiner Lake Translucent Brown.

At 41CV1133, a calibrated date of 1605–1505 B.C. was obtained on charcoal from near the base of an 80-cm-thick midden (Feature 1). An internal hearth (Feature 2, see below) was encapsulated within this deposit. The midden contained dense amounts of debitage, a mano, several stone tools, a Pedernales point, a bone, and some mussel shells. One of the shells exhibits cut marks, and one is perforated. The major identified chert types (36.8 percent) are Heiner Lake Tan, Table Rock Flat, and Fort Hood Yellow. The faunal materials suggest that mollusks may have been used as a source of food. In addition, the modified shells indicate their use for ornamental purposes at 41CV1133.

Feature 2, a basin-shaped hearth, was contained within and near the top of the midden at 41CV1133. A calibrated date of A.D. 865–960 obtained from this hearth correlates to the Late Prehistoric period Austin phase. The chronometric data for these two features indicate that the midden deposit represents repeated use over a period of approximately 2,500 years. The hearth contained debitage, two metate fragments, and charred oak wood. Neither the hearth nor the midden yielded edible plant remains, but the presence of ground stones in both implies collection and processing of the flora.

### **Discussion**

Of the five sites discussed above, three (41CV1120, 41CV1122, and 41CV1133) are located within a 1.5-km-area south of Table Rock Creek. These sites yielded the greatest quantities of cultural materials and also accounted for 8 of the 11 dated features. In addition, 7 of these features correlate to either the Middle or Late

Archaic periods and provide the most interpretable data. Table Rock Flat, Heiner Lake Tan, and Heiner Lake Blue are the most common identified chert types represented in the chipped stone assemblages from these sites. Bones associated with both time periods may indicate hunting; however, the unusually high frequency of mussel shells suggests that mussels were gathered from Table Rock Creek for food. In addition, modified shells probably represent the use of mussel shells as ornaments during the Late Archaic period. The recovered macrobotanical remains are limited to charred wood representing fuel, but these remains also indicate that preservation of organic materials is generally good. A mano and metates recovered from a midden deposit indicate that plant gathering and processing occurred during the Late Archaic and Late Prehistoric periods.

### **OTHER OPEN SITES**

This category subsumes six analysis units at five sites: 41BL340, 41CV755, 41CV957, 41CV1092, and 41CV1152 (Table 89). Situated adjacent to five different named drainages, each site is geographically isolated. Four of the five sites did not contain discrete cultural deposits. Intact components could not be distinguished at 41BL340 and 41CV755 due to the paucity of cultural materials. Although site 41CV1092 contained a burned rock midden (Feature 2), the shallowly buried deposit was very thin (20 cm or less) and seriously intermixed with unburned colluvial gravels. This suggests that the contextual integrity of the midden is compromised by depositional processes and the potential for archeological research is limited. At 41CV1152, a moderate amount of lithic artifacts and sparse burned rocks were buried in a late Pleistocene terrace ( $T_2$ ). Detailed examinations of the soil profiles indicated that artifacts were displaced due to the soil's shrink/swell processes. At this site, large artifacts were found in vertical positions, having moved down-profile within drying cracks in the vertisolic soils. This process, along with recent clearing and bulldozing activities, has destroyed the context of these cultural materials. No intact cultural deposits were found in a lower terrace ( $T_1$ ) at 41CV1152. Because 41CV957 is the only site considered to have archeological research potential, it is discussed in detail below.

Table 89. Summary of other open sites

Site	Location	Geomorphic Setting	Analysis Unit	Temporal/Cultural Period	Subsurface Testing BHTs	Subsurface Testing TUs	Comments
41BL340	Oak Branch	T <sub>1</sub>	1	unknown	3	3	cleared and scraped for firebreak
41CV755	Owl Creek	Cts	1	unknown	3	2	consumed by range fire in spring 1996
41CV957	Shoal Creek	T <sub>1a</sub> /T <sub>1b</sub>	1	Late Archaic	2	3	
41CV1092	Browns Creek	Cts	1	unknown		4	
41CV1152	Henson Creek	T <sub>2</sub>	1	unknown	3	5	consumed by range fire in spring 1996
		T <sub>1</sub>	2	unknown	1	1	cleared and scraped

### **Geomorphic Observations**

These five sites are situated in various drainages and depositional environments. Site 41BL340 is located along Oak Branch, a small ephemeral tributary of Cowhouse Creek. At this locality, Oak Branch cuts across the  $T_1$  terrace of Cowhouse Creek. Oak Branch is incised into the West Range alluvium of the  $T_1$  terrace, which is mantled by recent flood deposits.

Site 41CV755 is located along Owl Creek. Artifacts are buried in Holocene-age gravelly colluvium that drapes the Jackson alluvium of the  $T_2$  terrace and the Walnut Formation along the valley wall.

Site 41CV957 is located along Shoal Creek, an intermittent tributary of the Leon River. Artifacts and cultural features at site 41CV957 are buried in the  $T_1$  terrace, which is comprised of Ford alluvium laterally inset to the lower West Range alluvium.

Site 41CV1092 is located along upper reaches of Browns Creek, an intermittent tributary of Cowhouse Creek. Artifacts and cultural features are encapsulated in late Holocene colluvium that drapes the Walnut Formation, which forms the valley walls.

Site 41CV1152 is located along Henson Creek, a braided-meandering tributary of the Leon River. Cultural materials rest on and are buried in the  $T_1$  and  $T_2$  terraces. The  $T_1$  terrace is comprised of West Range alluvium, while the  $T_2$  terrace consists of Jackson alluvium with minor amounts of late Holocene alluvium and colluvium. Buried artifacts within the  $T_2$  terrace are primarily the result of downward movement of surface artifacts caused by the shrinking and swelling properties of the vertisolic soil mantle that caps the  $T_2$  terrace.

### **Cultural Observations**

At 41CV957, one discrete prehistoric component is defined by a shallowly buried, basin-shaped hearth and an associated burned rock concentration buried in the A horizon. The concentration was encountered directly above the hearth and probably represents discarded debris from hearth maintenance. A calibrated date of 1440–1400 B.C. obtained from the hearth indicates that this occupation occurred during the early portion of the Late Archaic period. The feature did not contain charred macrobotanical

remains, but yielded 45 pieces of debitage and 1 miscellaneous uniface. Approximately half of these artifacts were identified as an indeterminate light brown chert, while one-fourth were typed as Fort Hood Yellow. The latter is not surprising given the close proximity of this highly workable chert resource. The indeterminate light brown cherts most likely represent the range of variability of the Fort Hood Yellow material.

Although no subsistence remains were associated with the hearth, a sandstone metate observed in the trench's backdirt came from the A horizon and indicates that food gathering and processing activities occurred during the Late Archaic period. One in situ Pedernales point collected in the vicinity of the hearth corresponds with the date of this feature.

### **Discussion**

Buried in the West Range alluvium, a Late Archaic cultural component was identified at site 41CV957. The artifact assemblage is very limited, but this reflects the meager sample size.

To date, this is the only formally tested open campsite along Shoal Creek or its tributaries to contain a stratigraphically discrete and intact cultural deposit. Although Late Archaic components are relatively common on Fort Hood (Trierweiler 1996), site 41CV957 has the potential to provide archeological data specific to the paleoenvironment and human adaptations along Shoal Creek.

### **COMPARATIVE ANALYSIS OF CULTURAL FEATURES AND MATERIAL CULTURE**

This section examines the cultural features and material culture from Fort Hood sites tested during the 1996 field season. Each of the 74 features discussed herein was discovered in a test unit and was wholly or partially excavated by hand (Table 90). For consistency, the feature typology used here is the same as that used by Prewitt and Associates for the 1995 season site testing (Mehalchick et al. 1999). This taxonomy conforms to the feature typology previously established for Fort Hood during the prehistoric site reconnaissance and shovel testing phase by Mariah Associates (Trierweiler, ed. 1994: Appendix E), as modified slightly during their subsequent site testing phase (Abbott and



Table 90. Summary of investigated cultural features

Site		Analysis Unit	Geomorphic Setting	Feature Number	Excavation Exposures and Depth	Relationships to Other Features	Completely excavated feature	Minimum size of partially excavated features
Feature Size (length x width x thickness)								
ASH ANOMALY								
41CV1269	H-R	2	Toeslope	4	TU 1, BHT 2 (100–150 cm)	probable animal burrow within Feature 1	–	0.25 x 0.25 x 0.50 m
HEARTH, BASIN SHAPED								
41CV578	H-R	2	T <sub>1</sub>	5	TU 1, BHT 3 (124–142 cm)	–	–	0.70x0.68x0.18 m
41CV578	H-R	2	T <sub>1</sub>	7	TU 3, BHT 1 (93–108 cm)	–	–	1.00x1.00x0.15 m
41CV947	Paluxy	1	Paluxy	2	TU 1, BHT 1 (36–58 cm)	–	–	1.70x1.70x0.22 m
41CV957	Other	1	T <sub>1</sub>	3	TU 1, BHT 1 (22–37 cm)	directly below Feature 2	–	1.30x1.10x0.15 m
41CV988	Paluxy	1	Paluxy	2A	TU 1 (9–43 cm)	–	–	1.75x1.75x0.34 m
41CV988	Paluxy	1	Paluxy	4	TU 8 (19–41 cm)	–	0.50x0.40x0.22 m	–
41CV1049	Paluxy	1	Paluxy	7	TUs 1 and 2, BHT 2 (30–75 cm)	–	–	1.80x1.80x0.40 m
41CV1122	C-T-C	2	T <sub>1</sub>	4	TU 2 (100–129 cm)	–	–	2.75x2.75x0.30 m
41CV1133	C-T-C	1	T <sub>1</sub>	2	TUs 1 and 3, BHT 1 (10–34 cm)	internal hearth within midden Feature 1	–	1.80x1.80x0.24 m
41CV1138	Paluxy	1	Paluxy	1	TU 3, TT (29–38 cm)	–	–	not estimated
41CV1191	H-R	1	T <sub>1</sub> , Toeslope	2	TUs 2 and 3 (20–44 cm)	–	0.67x0.64x0.24 m	–
41CV1206	C-T-C	1	T <sub>1</sub>	2	TUs 1 and 2, BHT 3 (185–203 cm)	–	–	1.50x1.40x0.20 m
41CV1206	C-T-C	1	T <sub>1</sub>	3	TUs 1 and 2, BHT 3 (196–219 cm)	–	–	2.00x2.00x0.23 m
41CV1235	H-R	2	T <sub>1</sub>	7	TUs 1 and 2, BHT 5 (110–133 cm)	directly below Feature 6	–	2.10x1.50x0.25 m
41CV1250	H-R	2	T <sub>1</sub>	5	TU 2, BHT 3 (128–148 cm)	–	–	1.20x1.20x0.20 m
41CV1250	H-R	2	T <sub>1</sub>	6	TU 2 (137–148 cm)	–	–	1.00x1.00x0.20 m
41CV1250	H-R	2	T <sub>1</sub>	7	TU 1, Outbank (100–117 cm)	–	–	0.90x0.90x0.15 m
41CV1269	H-R	2	T <sub>1</sub>	3	TU 2, BHT 2 (140–180 cm)	–	–	1.55x1.55x0.40 m
41CV1269	H-R	3	Midslope bench	6	TU 4 (60–83 cm)	internal hearth within midden Feature 2	–	1.50x1.50x0.25 m
41CV1282	H-R	1	T <sub>1</sub>	4	TUs 4 and 5 (0–19 cm)	–	–	1.60x1.20x0.19 m
HEARTH, FLAT								
41CV578	H-R	1	T <sub>1</sub>	9	TU 4, BHT 5 (123–139 cm)	–	–	1.60x0.90x0.16 m
41CV578	H-R	3	T <sub>1</sub>	6	TU 2, BHT 4 (67–92 cm)	–	–	1.68x1.14x0.25 m
41CV1049	Paluxy	1	Paluxy	1A	TU 3, TT (15–32 cm)	–	–	not estimated
41CV1143	Paluxy	1	Paluxy	6	TU 2 (24–43 cm)	–	–	not estimated
41CV1235	H-R	1	T <sub>1</sub>	4	TU 5, BHT 4 (44–68 cm)	–	–	1.46x1.46x0.44 m
41CV1258	Paluxy	1	Paluxy	4	TUs 3 and 4 (25–39 cm)	–	0.70 x 0.68 x 0.14 m	–

Table 90, continued

Site		Analysis Unit	Geomorphic Setting	Feature Number	Excavation Exposures and Depth	Relationships to Other Features	Feature Size (length x width x thickness)	
Site	Group						Completely excavated feature	Minimum size of partially excavated features
BURNED ROCK CONCENTRATION								
41CV578	H-R	3	T <sub>1</sub>	4	TU 2, BHT 4 (23-34 cm)	-	-	not estimated
41CV578	H-R	1	T <sub>1</sub>	8	TU 4, BHT 5 (104-177 cm)	-	-	not estimated
41CV957	Other	1	T <sub>1</sub>	2	TUs 1 and 3, BHT (12-23 cm)	-	-	not estimated
41CV1030	C-T-C	2	T <sub>0</sub>	1	TU 5, BHT 10 (130-141 cm)	-	-	not estimated
41CV1030	C-T-C	2	T <sub>0</sub>	2	TU 8, BHT 10 (146-163 cm)	-	-	not estimated
41CV1043	Paluxy	1	Paluxy	4	Tus 4 and 6 (32-50 cm)	-	-	not estimated
41CV1093	Paluxy	1	Paluxy	6	TU 3 (25-35 cm)	-	-	not estimated
41CV1093	Paluxy	1	Paluxy	8	TU 4 (24-42 cm)	-	-	not estimated
41CV1106	Paluxy	1	Paluxy	1	TU 1 (0-20 cm)	-	-	3.00x2.50x0.20 m
41CV1120	C-T-C	1	T <sub>1</sub>	1	TU 1, BHT 1 (57-68 cm)	-	-	not estimated
41CV1120	C-T-C	1	T <sub>1</sub>	2	TU 3 (80-91 cm)	-	-	not estimated
41CV1122	C-T-C	1	T <sub>1</sub>	3	TU 1, BHT 2 (70-80 cm)	-	-	not estimated
41CV1122	C-T-C	2	T <sub>1</sub>	5	TU 1, BHT 2 (80-96 cm)	-	-	not estimated
41CV1138	Paluxy	1	Paluxy	2	TU 5, TT (30-36 cm)	-	-	not estimated
41CV1143	Paluxy	1	Paluxy	1A	TU 1 (14-28 cm)	-	-	not estimated
41CV1191	Paluxy	3	Paluxy	3	TU 5 and 6 (10-30 cm)	-	-	not estimated
41CV1194	H-R	2	T <sub>1</sub>	2	TU 1, BHT 1 (137-148 cm)	-	-	0.95x0.95x0.10 m
41CV1219	H-R	1	T <sub>1</sub>	1	TU 4, TT (143-155 cm)	-	-	not estimated
41CV1235	H-R	2	T <sub>1</sub>	3	TU 3, BHT 2 (165-179 cm)	-	-	1.40x1.05x0.14 m
41CV1235	H-R	2	T <sub>1</sub>	6	TUs 1 and 2, BHT 5 (102-124 cm)	-	-	4.20x2.00x0.22 m
41CV1269	H-R	2	T <sub>1</sub>	5	TU 3, BHT 3 (150-182 cm)	-	-	not estimated
41CV1275	H-R	4	T <sub>1</sub>	3	TUs 4 and 8 (42-54 cm)	-	-	not estimated
41CV1275	H-R	4	T <sub>1</sub>	4	TU 5, BHT 1 (20-38 cm)	-	-	not estimated
41CV1275	H-R	3	T <sub>1</sub>	5	BHT 13 (35-50 cm)	-	-	not estimated
41CV1283	Paluxy	1	Paluxy	3	TU 1 (25-30 cm)	-	-	not estimated
41CV1287	H-R	1	Midslope bench	3	TU 5 (20-32 cm)	-	-	not estimated
BURNED ROCK MIDDEN								
41CV1048	C-T-C	1	T <sub>1</sub> , Toeslope	1	TUs 1 and 2, BHT 1 (20-70 cm)	-	-	15.00x13.00x0.50 m
41CV1092	Other	1	Toeslope	2	TUs 1 and 3 (10-30 cm)	-	-	75.00x30.00x0.20 m
41CV1122	C-T-C	1	Toeslope	1	TU 3 (0-40 cm)	-	-	19.00x10.00x0.40 m
41CV1122	C-T-C	1	T <sub>1</sub>	2	TU 2, BHT 1 (40-84 cm)	may be same as Feature 1	-	25.00x15.00x0.30 m
41CV1133	C-T-C	1	T <sub>1</sub>	1	TUs 1 and 3, BHT 1 (0-80 cm)	-	-	60.00x30.00x0.80 m
41CV1191	H-R	2	T <sub>1</sub> , Toeslope	1	TU 4 (0-48 cm)	-	-	not estimated
41CV1194	Paluxy	1	Paluxy	1	TU 2 (0-29 cm)	-	-	35.00x25.00x0.30 m

Table 90, continued

Site	Site Group	Analysis Unit	Geomorphic Setting	Feature Number	Excavation Exposures and Depth	Relationships to Other Features	Feature Size (length x width x thickness)		
							Completely excavated feature	Minimum size of partially excavated features	
BURNED ROCK MIDDEN, continued									
41CV1221	H-R	2	T <sub>2</sub>	1	TUs 1 and 3, Cutbank (0-30 cm)	-	-	17.00x10.00x0.30 m	
41CV1235	H-R	1	T <sub>1</sub> , Toeslope	1	TUs 1 and 2, BHT 5 (10-138 cm)	-	-	130.00x45.00x0.70 m	
41CV1269	H-R	2	T <sub>1</sub> , Toeslope	1	TU 1, BHT 2 (0-150 cm)	-	-	70.00x30.00x1.00 m	
41CV1269	H-R	3	Midslope bench	2	TU 4, BHTs 7 and 8 (0-100 cm)	-	-	25.00x20.00x0.50 m	
41CV1286	H-R	1	Toeslope	2	TU 10 (0-40 cm)	-	-	40.00x30.00x0.40 m	
BURNED ROCK MOUND									
41CV984	Paluxy	1	Paluxy	2	TUs 1, 4, and 5 (0-60 cm)	-	-	10.00x10.00x0.57 m	
41CV1093	Paluxy	1	Paluxy	4	TU 1 (12-51 cm)	-	-	5.00x5.00x0.40 m	
41CV1287	H-R	1	Midslope bench	1	TU 1 (0-23 cm)	-	6 x 6 x 0.25 m	-	
OCCUPATION ZONE									
41CV947	Paluxy	1	Paluxy	1	TU 3, TT (0-32 cm)	-	-	4.00x1.50x0.22 m	
41CV947	Paluxy	1	Paluxy	3	TU 2, BHT 1 (60-90 cm)	-	-	7.00x2.00x0.30 m	
41CV1106	Paluxy	1	Paluxy	4	TU 3 (42-63 cm)	-	-	5.00x5.00x0.21 m	
41CV1235	H-R	2	T <sub>1</sub>	5	TUs 1 and 2, BHT 5 (75-95 cm)	-	-	3.20x1.70x0.20 m	
41CV1235	H-R	1	T <sub>1</sub>	8	TU 4, BHT 4 (50-70 cm)	-	-	not estimated	
41CV1250	H-R	1	T <sub>1</sub>	4	TU 1, Cutbank (50-80 cm)	-	-	not estimated	

Trierweiler 1995a:Figure 9.1). An **ash anomaly** is defined as a concentration of ashy sediment in an irregular pattern. It is similar to the ash lens defined by Mariah Associates (see Abbott and Trierweiler 1995:782), but its shape is so irregular that it is considered to be intrusive (i.e., probably an animal burrow). **Hearths** are clusters of rocks in layers (generally one or two clasts thick) that usually form a circular or ovate pattern (see Abbott and Trierweiler 1995:776–780). They represent rocks that were intentionally placed to contain a fire. A flat hearth has layers of rocks that are essentially level; a basin-shaped hearth has layers of rocks that slope inward, forming a distinctive basin or bowl shape. Hearths are in situ features that have not been significantly disturbed by postdepositional processes. A **burned rock concentration** is, “a relatively shallow, amorphous grouping of burned rocks, typically one to two clasts thick, located on an extant surface or a buried paleosurface” (see Abbott and Trierweiler 1995:776). A classic burned rock concentration may be easily recognizable, but this feature type also is a catchall grouping that includes a wide range of amorphous burned rock features. Burned rock concentrations may be intact and represent discrete activity areas or they may reflect postdepositional disturbance (e.g., displaced hearths or eroded middens). A **burned rock midden** is, “a relatively thick, amorphous deposit or buried burned rock[s] that does not exhibit significant relief and varies greatly in shape and size” (see Abbott and Trierweiler 1995:775). A **burned rock mound** is “an accumulation of burned rock (typically limestone) exhibiting discernable relief above the ground surface and having a fairly regular, circular or oval shape in planview” (see Abbott and Trierweiler 1995:773). An **occupation zone** is a grouping of cultural materials on an extant surface or a buried paleosurface. An occupation zone may include burned rocks (and is in some ways similar to a burned rock concentration), but other artifacts (e.g., chipped stone tools and debitage, bones, or mussel shells) also are present. An occupation zone that is intact represents a living surface where activities occurred.

For the sample of features reported herein, only six feature types are used. The 74 investigated features are classified as follows:

Ash Anomaly (or Ash Stain)	1
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Hearth, Basin shaped	
(2 are within middens)	20
Hearth, Flat	6
Burned Rock Concentration	26
Burned Rock Midden	12
Burned Rock Mound	3
Occupation Zone	6

With the exception of the ash anomaly, all of the investigated features commonly contain or are composed primarily of burned rocks. Individual features are described in detail in their respective site summaries in Chapters 6–9. Calibrated radiocarbon dates on feature-associated charcoal provide absolute chronological evidence for the utilization of 45 of these prehistoric features (Table 91). A graphic display of these chronological data shows the temporal distributions of the various types of features (Figure 152). Each of the six feature types is discussed separately below, and associated artifact assemblages are mentioned when appropriate.

### Ash Anomaly

The ash anomaly (Feature 4) is a small feature embedded within a larger burned rock midden (Feature 1) at 41CV1269 (see Chapter 7). This 25-cm-diameter feature consists of an unconsolidated ashy/charcoal-stained matrix from 101–118 cm, within which a miscellaneous biface and indeterminate hardwood fragments were recovered (see Appendix E). The upper portion was well defined, but the ashy matrix in the lower portion (from 118–150 cm) was more diffuse and tapered in an irregular manner. Because the ashy stain turned at an abrupt angle at its base, at least the lower portion of this feature is thought to be within or to have been disturbed by an animal burrow. However, it was not determined whether the upper portion of the ash concentration was a product of natural or cultural burning. No radiocarbon date was obtained for this feature.

### Hearths

The 26 investigated hearths all contain burned limestone rocks and are described as basin shaped ( $n = 20$ ) or flat ( $n = 6$ ). These hearths were found at 16 of the 42 (38.1 percent) tested sites. Most of these features were only partially excavated because parts of them were destroyed

**Table 91. Summary of calibrated charcoal radiocarbon dates for 45 cultural features**

Site	Feature No.	Calibrated Calendrical Date	Time Period
<b>HEARTH, BASIN SHAPED</b>			
41CV578	5	2145–2015 B.C.	Middle Archaic
41CV578	7	3650–3530 B.C.	Middle Archaic
41CV947	2	A.D. 90–210	Late Archaic
41CV957	3	1440–1400 B.C.	Late Archaic
41CV988	2A	A.D. 685–785	Late Archaic
41CV988	4	A.D. 770–875	Late Prehistoric (Austin)
41CV1049	7	A.D. 420–550	Late Archaic
41CV1122	4	3960–3800 B.C.	Middle Archaic
41CV1133	2	A.D. 865–960	Late Prehistoric (Austin)
41CV1138	1	760–415 B.C.	Late Archaic
41CV1191	2	A.D. 405–450	Late Archaic
41CV1206	3	2865–2585 B.C.	Middle Archaic
41CV1206	2	2865–2580 B.C.	Middle Archaic
41CV1235	7	3335–3070 B.C.	Middle Archaic
41CV1250	5	A.D. 780–885	Late Prehistoric (Austin)
41CV1250	7	A.D. 885–980	Late Prehistoric (Austin)
41CV1269	6	800–600 B.C.	Late Archaic
41CV1269	3	2175–2025 B.C.	Middle Archaic
<b>HEARTH, FLAT</b>			
41CV578	9	A.D. 560–635	Late Archaic
41CV1049	1A	A.D. 380–590	Late Archaic
41CV1143	6	365–190 B.C.	Late Archaic
41CV1235	4	1420–1305 B.C.	Late Archaic
41CV1258	4	A.D. 120–235	Late Archaic
<b>BURNED ROCK CONCENTRATION</b>			
41CV1030	2	A.D. 1655–1950	Historic
41CV1120	2	1400–1265 B.C.	Late Archaic
41CV1122	3	1895–1760 B.C.	Late Archaic
41CV1122	5	2870–2595 B.C.	Middle Archaic
41CV1143	1A	A.D. 785–885	Late Prehistoric (Austin)
41CV1194	2	2875–2605 B.C.	Middle Archaic
41CV1235	3	3370–3340 B.C.	Middle Archaic
41CV1269	5	2205–2040 B.C.	Middle Archaic
<b>BURNED ROCK MIDDEN</b>			
41CV1048	1	2470–2325 B.C.	Middle Archaic
41CV1122	2	1390–1265 B.C.	Late Archaic
41CV1122	1	1285–1145 B.C.	Late Archaic
41CV1133	1	1605–1505 B.C.	Late Archaic
41CV1191	1	1510–1415 B.C.	Late Archaic
41CV1235	1	2400–2205 B.C.	Middle Archaic
41CV1269	1	2135–1975 B.C.	Middle/Late Archaic
41CV1269	2	A.D. 1270–1300	Late Prehistoric (Toyah)
<b>BURNED ROCK MOUND</b>			
41CV984	2	915–830 B.C.	Late Archaic
41CV1093	4	A.D. 620–660	Late Archaic

Table 91, continued

Site	Feature No.	Calibrated Calendrical Date	Time Period
OCCUPATION ZONE			
41CV947	1	A.D. 645–685	Late Archaic
41CV1106	4	A.D. 1450–1625	Late Prehistoric (Toyah)
41CV1235	5	2865–2585 B.C.	Middle Archaic
41CV1250	4	A.D. 1310–1415	Late Prehistoric (Toyah)

by erosion or backhoe trenching. Some of the larger hearths were only partially excavated because they extended into adjacent units that were not excavated. Only three hearths (Feature 2 at 41CV1191, Feature 4 at 41CV988, and Feature 4 at 41CV1258) were completely excavated, thus allowing a confident measurement of their complete dimensions. Because most of the partially excavated hearths were obviously circular or ovate, their dimensions could be estimated with a fair degree of accuracy. Hearths range in size (whether actual or estimated) from 60x70 cm up to 150x210 cm; they range in thickness from 14 to 44 cm (see Table 90). Two of the basin-shaped hearths (Feature 2 at 41CV1133 and Feature 6 at 41CV1269) were found within burned rock middens (see below) and are interpreted as internal cooking pits or earth oven beds as described by Black et al. (1997:259–260).

Previous investigators created a hearth taxonomy based on feature morphology and construction (Abbott and Trierweiler 1995a:777). Hearths were first classified into a morphological group as either basin shaped or flat, and they were further classified by the amount and/or type of rocks used in their construction. The 26 hearths reported herein are classified into corresponding types as shown in Table 92. The distinction in rock type denotes whether hearths were constructed primarily of angular rock fragments or tabular slabs. Although the hearths in this sample tend to fall clearly into one category or the other, the cultural significance of this difference is not understood. This difference would imply that some hearths were built from broken rocks that had been heated many times, while others were built from larger slabs that were not yet fractured by heating.

All of the hearths were comprised of at least one layer of rocks lining their bases, and many were comprised of two or more layers of over-

lapping rocks. The presence or absence of an oxidized rind (i.e., a basal layer of burned earth at or below the bottom layer of rocks) was not used as a criteria to define the types. Such oxidized rinds were noted on occasion, but their presence is considered too dependent upon noncultural conditions (e.g., the texture of the sediments and age of deposits) to be a meaningful variable.

The organic remains recovered from hearth matrices provide important information pertaining to prehistoric lifeways (see Appendix E). A wide variety of wood fuels and food resources was identified, and these remains often could be associated with radiocarbon dates establishing when the resources were used. Although oak is the most prevalent type of charred wood identified in the hearth-matrix samples, wood from ash, elm, hackberry, holly, juniper, rose, walnut, and willow also was identified. Potential food resources represented by macrobotanical assemblages in the hearth-fill include indeterminate corm (i.e., storage root) and fruit fragments, thin and thick unidentified nutshells (probably attributable to pecan and walnut), and pecan nutshells. Other economic resources found in association with hearths include bones (see Appendix D) and mussel shells. Although bones were observed in many of the hearths, mussel shells were recovered only from two basin-shaped hearths (Feature 7 at 41CV578 and Feature 4 at 41CV1122). It is not certain whether these animal remains represent foods that were being cooked and/or processed in hearths, or simply debris that was discarded into hearths.

Radiocarbon ages were obtained on charcoal from 23 of the 26 hearths (see Figure 152). Calibrated dates indicate that these features were used as early as 3960 B.C. to as late as A.D. 980. Most date to the Middle and Late Archaic periods, although several date to the terminal Late Archaic and transition into the Late Prehistoric.

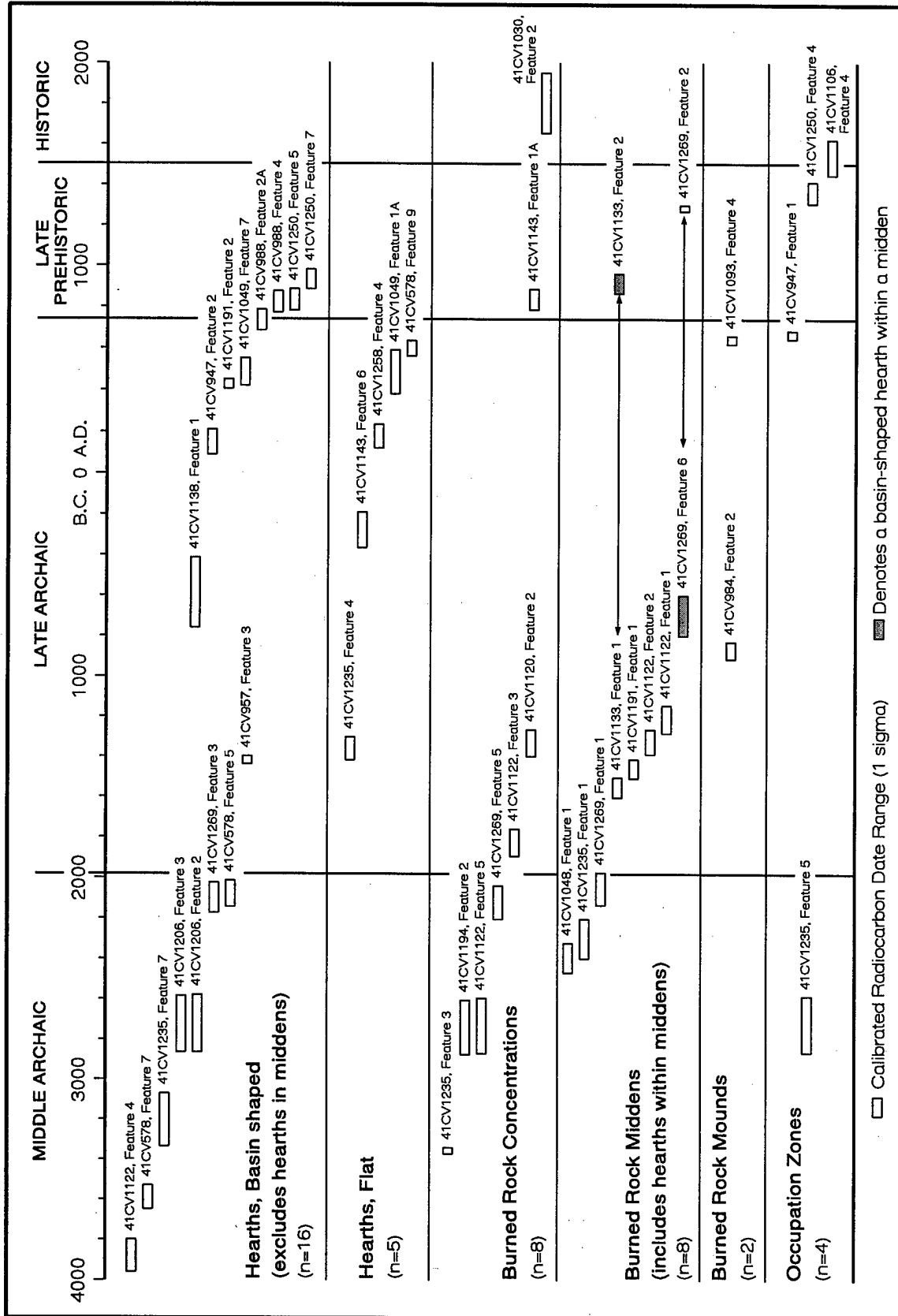


Figure 152. Comparison of calibrated charcoal radiocarbon dates for 45 cultural features, by feature type.

**Table 92. Summary of hearths by type**

Morphological Group	Rock Type Group	Site Number, Feature Number	
Basin-Shaped Hearths (n = 20)	Angular Rock Layered	41CV578, Feature 7	41CV1250, Feature 5
		41CV957, Feature 3	41CV1250, Feature 6
		41CV1122, Feature 4	41CV1250, Feature 7
		41CV1191, Feature 2	41CV1282, Feature 4
	Slab Layered	41CV578, Feature 5	41CV1138, Feature 1
		41CV947, Feature 2	41CV1206, Feature 2
		41CV988, Feature 2A	41CV1206, Feature 3
		41CV988, Feature 4	41CV1235, Feature 7
		41CV1049, Feature 7	41CV1269, Feature 3
		41CV1133, Feature 2	41CV1269, Feature 6
Flat Hearths (n = 6)	Angular Rock Layered	41CV1143, Feature 6	41CV1258, Feature 4
	Slab Layered	41CV578, Feature 6	41CV1049, Feature 1A
		41CV578, Feature 9	41CV1235, Feature 4

### Burned Rock Concentrations

Twenty-six burned rock concentrations were investigated, but none were completely excavated. Because of limited exposures and their amorphous shapes, reasonable size estimates were possible only for four burned rock concentrations (see Table 90). The functions of these features are questionable, but many of them probably represent the remains of dispersed hearths or burned rocks scattered on a former living surface. Of six analyzed flotation samples from burned rock concentrations, four were devoid of macrobotanical remains and two contained charred oak wood (see Appendix E). One bone was recovered from one of the concentrations, and six mussel shells were found in three others. Radiocarbon ages were obtained on charcoal from 8 of the 26 burned rock concentrations, and the calibrated dates range from 3370 B.C. to A.D. 1950 (see Figure 152).

### Burned Rock Middens

Twelve burned rock middens from 10 different sites were investigated. Half of these were vandalized to some extent, with Feature 1 at 41CV1269 being the most severely impacted. Six middens exhibited no evidence of vandalism. Only small portions of these features were tested, but reasonable estimates of their sizes were made possible by the presence of burned rocks in multiple test units and in exposures (e.g.

roads, tree-clearing depressions) and excavations (i.e., backhoe trenches and test units). The estimated sizes of 11 of the 12 middens range from 13x15 m to 45x130 m. Maximum thicknesses varied from 20–80 cm, with a mean midden thickness of ca. 47 cm (see Table 90). Internal features discovered in the burned rock middens include a slab-lined hearth (Feature 2) within Feature 1 at 41CV1133, a slab-lined bedrock depression (Feature 6) at the base of Feature 2 at 41CV1269, and an ash anomaly (Feature 4) within Feature 1 at 41CV1269. The recognition and identification of slab-lined hearths within middens was possible because these internal pit features are composed of larger and often unfractured rocks that are noticeably different from the smaller and more-angular rocks composing the surrounding midden matrix. While internal pit features within some burned rock mounds on Fort Hood are located at the center (and often are found at the base of) the mound, internal hearths within burned rock middens have been discovered at various vertical and horizontal locations within the larger accumulation. This suggests that burned rock middens may not represent residue derived from a single, central hearth or earth oven. Rather, the middens at Fort Hood appear to represent accumulations from multiple hearths or earth ovens throughout the midden matrix.

Another emerging cultural pattern is that ground stone tools are common at some burned rock mound and midden sites but seem to be very



rare or absent at others. Ground stone fragments (mainly metate pieces) were commonly recycled and used in the construction of internal hearths. Examples of recycled ground stones fragments found in the slab-lined edges of internal hearths are seen in Feature 2 at 41CV1133 (see Chapter 8) and Feature 2 at 41BL155 (Mehalchick et. al. 1999). Presumably, the presence of recycled ground stone within middens denotes a high intensity of plant processing activities and relatively intensive and/or repeated occupations.

Oak is the most prevalent type of charred wood identified in the flotation samples from burned rock middens, but juniper and willow also are represented (see Appendix E). Bones, ranging in quantity from 1 to 140, were found in five of the middens, and from 1 to 19 mussel shells were found in four middens. Two modified mussel shells were recovered from Feature 1 at 41CV1133. Chipped stone debitage and tools are often abundant and diverse within some middens. Notably higher frequencies of ground stone fragments tend to occur in middens with abundant chipped stone artifacts, further suggesting

that occupations were more frequent and/or intensive at some middens than at others.

Diagnostic projectile points recovered from burned rock middens are dominated by Late Archaic dart points ( $n = 35$ ) spanning Bulverde to Ensor, with Pedernales being the most common type (Table 93). Middle Archaic dart points and arrow points are present but less frequent. Radiocarbon ages were obtained on charcoal from 8 of the 12 burned rock middens and from the two internal pit features (Feature 2 at 41CV1133 and Feature 6 at 41CV1269). The calibrated date ranges for these features span from 2470 B.C. to A.D. 1300 (see Figure 152). Chronometric data and/or diagnostic projectile points in stratigraphic sequence reveal that the middens at sites 41CV1133, 41CV1235, and 41CV1269 represent accumulations attributable to multiple time periods. In all likelihood, these middens were reused many times over several thousand years.

### Burned Rock Mounds

Three burned rock mounds were investigated. All three have a domed morphology (in

**Table 93. Projectile points recovered from burned rock middens**

Period	Point Type	Number of Specimens*		Totals
		Confident Association	Questionable Association	
Middle Archaic	Provisional Type I	4	—	4
Late Archaic	Bulverde	—	1	1
	Castroville	2	4	6
	Edgewood	—	2	2
	Ensor	—	1	1
	Marcos	—	1	1
	Marshall	—	4	4
	Montell	1	1	2
	Pedernales	6	4	10
Subtotals		9	18	27
Unspecified Archaic	Untyped Dart Point	2	—	2
	Untypeable Dart Point	7	1	8
Subtotals		9	1	10
Late Prehistoric	Alba	—	1	1
	Untypeable Arrow Point	2	—	2
Subtotals		2	1	3
Totals		24	20	44

\*Confident association denotes points recovered from hand-excavated feature fill. Questionable association denotes points recovered from backhoe trench backdirt that almost certainly came from the midden deposits.

contrast to annular or incipient mounds, see Abbott and Trierweiler [1995a:Figure 9.1]), but no central depressions were evident on the surface or in the excavations at any of them. None of these mounds exhibit evidence of vandalism, but all are disturbed to some degree by natural erosion and/or military impacts. Feature 2 at 41CV984 and Feature 4 at 41CV1093 are partially buried in Paluxy sediments, while Feature 1 at 41CV1287 is completely exposed and rests on a bedrock bench.

These mounds range from 5 to 10 m in diameter (actual or estimated sizes) and from 25 to 57 cm in thickness (see Table 90). Although internal features were not discovered, the edge of a bedrock depression was observed in the test unit profile at the base of Feature 4 at 41CV1093. The limited exposure did not reveal whether this depression was natural or an intentional cultural modification (i.e., a central cooking pit). Flotation samples from both of the Paluxy site mounds were analyzed for macrobotanical remains. None were recovered from Feature 2 at 41CV984, but charred ash, rose, and oak wood and fragments of a thick unidentified nutshell were recovered from Feature 4 at 41CV1093. No bones, mussel shells, or projectile points were recovered from the test excavations on the three burned rock mounds; very few chipped stone tools (only bifaces and modified flakes) were found in these features. Although the distributional data are limited, the test excavations in the mound at 41CV984 reveal a higher frequency of lithic artifacts at the downslope margin of the feature. This distribution may reflect dumping of lithic debris generated by chipping activities that occurred downslope from the central hearth or cooking oven. Calibrated radiocarbon dates obtained on charcoal from near the bases of the two Paluxy site mounds indicate that both are Late Archaic features (see Figure 152).

### **Occupation Zones**

Six features at four sites are defined as occupation zones and probably represent accumulations of cultural debris on a living surface. Estimated sizes for four of these features range from 3.2x7.0 m to approximately 5 m in diameter, and thicknesses range from 20–30 cm (see Table 90). None exhibit evidence of vandalism, and no other features (e.g., hearths) were discovered within these occupation zones.

Although these features are stratigraphically discrete, their spatial morphology is vague and their material culture content varies considerably. The only flotation samples in which macrobotanical remains were identified came from Feature 4 at 41CV1250. Identified remains included charred elm, hackberry, oak, and willow wood (see Appendix E). Bones ranging in quantity from 25 to 82 were found in three of these features, and from 1 to 10 mussel shells were found in two flotation samples. Chipped stone tools were associated with four of the occupation zones; quantities range from a single biface from Feature 4 at 41CV1106 to 15 tools from Feature 4 at 41CV1250.

Diagnostic projectile points recovered from the six occupation zones are few; two untypeable dart points were found in Feature 8 at 41CV1235 and one Scallorn and one Clifton in Feature 4 at 41CV1250. Calibrated radiocarbon dates obtained on charcoal from four of these features indicate occupations at 41CV1235 during the Middle Archaic, while occupations at the other three sites occurred between A.D. 645 and 1625 (see Figure 152).

### **Mounds vs. Middens**

It is generally acknowledged that burned rock middens and mounds represent accumulations of rocks and rock fragments that were once heated in order to process and/or cook some type(s) of plant and/or animal resource(s). However, there is much less agreement regarding such things as: (1) what resources were being cooked?; (2) how specialized (i.e., task- or resource-specific) or generalized (i.e., multifunctional) these processing localities were and what other activities occurred at them?; (3) what are the precise formation processes (i.e., cooking techniques and postdepositional actions) responsible for these accumulations?; and (4) how can the considerable variability in feature size and morphology be explained? (e.g., Abbott et al. 1996; Black et al. 1997; Collins 1991; Creel 1986, 1991; Goode 1991; Howard 1991; Kleinbach et al. 1995; Prewitt 1991). As noted by Ellis et al. (1994:58–63), there is considerable disagreement as to what different “types” of middens are represented in the archeological record, and what terms should be used to distinguish them. This study agrees with a hypothesis developed through previous work by TRC Mariah (Abbott

et al. 1996; Kleinbach et al. 1995) that suggests that mounds and middens on Fort Hood are two very different things. Under this theoretical framework, both mounds and middens formed as residue (i.e., primarily burned rocks but also including other types of cultural debris) was discarded from food cooking in earth ovens over long periods of time.

The variations in the shapes and sizes of the resulting residue piles are thought to be due to the geologic/geomorphic locations of these processing features, how long and how intensively they were used, and the other types of activities that occurred at these sites. While a great deal of variability in morphology is represented in the large burned rock features in Central Texas, the Fort Hood evidence suggests that the primary distinction is between round or oval mounds of burned rocks that accumulated as residue discarded from a single central earth oven and irregular-shaped accumulations that may have accumulated as residue discarded from multiple earth ovens and various other activities (e.g., open hearths, stone boiling, general camp maintenance and trash discard). The earth ovens or cooking pits within mounds and middens may have been cleaned out and reused many times, but there is only one such pit oven centrally located within each mound. In contrast, there may be many such ovens within middens, as well as many other types of subtle features reflecting other activities.

On Fort Hood, mounds are generally confined to the uplands, valley slopes, and midslope benches, and they occur primarily in areas with little or no deposition. It is possible that burned rock mounds will be found buried along valley toeslopes and/or in alluvial terraces, but none have been positively identified in these settings at Fort Hood. In contrast, middens are typically found along the toeslopes of the lower valley margins and in alluvial terraces, but they are occasionally found on midslope benches or low strath terraces. Fort Hood middens often conform to the local topography. For example, long linear middens are characteristic of the toeslopes, where they are commonly buried in colluvium. Based on the recovery of various types of cultural materials, mounds on Fort Hood appear to be very specialized activity areas where relatively few activities took place. In contrast, midden deposits frequently contain a wide range of chipped and ground stone tools and debitage

from the manufacture of tools. Bones and shell middens that occur near limestone outcrops where cherts are present usually contain copious amounts of lithic debitage and broken tools (Abbott et al. 1996; Kleinbach et al. 1995).

The characteristics of the Fort Hood burned rock middens and mounds investigated in 1996 conform to the general characteristics observed for previously investigated Fort Hood middens and mounds. As summarized in Table 94, the geographic and geomorphic settings of these middens and mounds are essentially the same as previously observed, as are the differences in the recovery rates of various types of cultural debris. Burned rocks are the ubiquitous element common to both middens and mounds; however, other types of artifacts (i.e., points, other stone tools, lithic debitage, and unmodified bones and shells) are commonly associated with midden deposits but seem to be rare to absent in mounds.

When the numbers of cultural artifacts recovered from middens and mounds are converted to densities per cubic meter, as shown in Table 95, the data show some striking differences. Although the sample is small (i.e., 12 middens and 3 mounds), the density data show that burned rocks are 1.45 times more common by weight per cubic meter in burned rock mounds than they are in burned rock middens. This simply implies that burned rocks comprise a greater portion of the matrix within mounds while midden matrix contains more fine-grained sediment. The logical inference is that the mounds represent accumulations in settings where deposition of fine sediments is minimal, while cultural debris in middens accumulated at the same time as fine-grained colluvial and/or alluvial sediments. The burned rock data derived by TRC Mariah (see Abbott et al. 1996: Table 8.3) are strikingly similar. Comparing the burned rock frequency data for their sample of 18 mounds and 55 middens shows that burned rocks are 1.35 times more dense by weight per cubic meter in mounds than in middens. The size of individual rocks (as expressed by average rock weight) also is larger in mounds (0.20 kg) than in middens (0.15 kg).

#### **BURNED ROCK MIDDENS AND MOUNDS**

Projectile points are found in 10 of the 12 tested middens, but are absent in all 3 of the

Table 94. Summary of cultural materials recovered from burned rock middens and mounds

Site	Feature No.	Geomorphic Setting	Test Unit, Depth	Volume Excavated	Burned Rocks by Count/Weight	Arrow/ Dart Points	Cultural Materials			
							Other Chipped/ Ground Stone Tools	Unmodified Debitage	Unmodified Bones	Unmodified Mussel Shells
BURNED ROCK MIDDENS										
41CV1048	1	T <sub>1</sub> , toeslope	Test Unit 1, 30–70 cm	0.8 m <sup>3</sup>	740/433	–	–	3	–	–
41CV1092	2	toeslope	Test Unit 2, 20–60 cm Test Unit 1, 10–30 cm	0.3 m <sup>3</sup>	248/73	0/1	9/0	104	–	–
41CV1122	1	toeslope	Test Unit 3, 10–20 cm	0.4 m <sup>3</sup>	230/54	–	–	10	2	19
41CV1133	2	T <sub>1</sub>	Test Unit 3, 0–40 cm	0.4 m <sup>3</sup>	1,312/152	0/1	6/0	166	–	4
	1	T <sub>1</sub>	Test Unit 2, 40–84 cm	1.5 m <sup>3</sup>	6,386/763	0/4	7/0	145	1	6
41CV1191	1	T <sub>1</sub> , toeslope	Test Unit 1, 0–80 cm	0.5 m <sup>3</sup>	1,131/196	0/2	3/0	64	–	–
41CV1194	1	Paluxy	Test Unit 3, 0–70 cm	0.3 m <sup>3</sup>	299/54	–	–	12	–	–
41CV1221	1	T <sub>2</sub>	Test Unit 2, 0–29 cm	0.6 m <sup>3</sup>	995/134	0/4	12/0	667	–	–
41CV1235	1	T <sub>1</sub> , toeslope	Test Unit 1, 0–30 cm Test Unit 3, 0–30 cm	1.2 m <sup>3</sup>	7,481/1,038	0/5	20/1	731	140	–
41CV1269	1	T <sub>1</sub> , toeslope	Test Unit 2, 20–76 cm	0.6 m <sup>3</sup>	469/82	0/15	3/0	74	26	–
41CV1286	2	toeslope bench	Test Unit 1, 80–150 cm*	0.6 m <sup>3</sup>	722/166	0/8	34/1	1,109	83	1
	2	toeslope	Test Unit 4, 20–83 cm Test Unit 10, 0–40 cm	0.4 m <sup>3</sup>	934/86	1/0	14/0	347	–	–
Subtotals				7.6 m <sup>3</sup>	20,947/3,231	1/40	108/2	3,432	252	30
BURNED ROCK MOUNDS										
41CV984	2	Paluxy	Test Unit 1, 0–57 cm Test Unit 4, 40–50 cm	1.0 m <sup>3</sup>	3,976/744	–	5/0	146	–	–
41CV1093	4	Paluxy	Test Unit 5, 20–50 cm	0.4 m <sup>3</sup>	424/181	–	1/0	53	–	–
41CV1287	1	toeslope bench	Test Unit 1, 12–51 cm Test Unit 1, 0–23 cm	0.2 m <sup>3</sup>	175/62	–	1/0	–	–	–
Subtotals				1.6 m <sup>3</sup>	4,575/987	0/0	7/0	199	0	0
Totals				9.2 m <sup>3</sup>	25,522/4,218	1/40	115/2	3,631	252	30
*Test Unit 1 at 41CV1269 was a 1x0.5-m unit from 80–100 cm and then expanded at the bottom of a backhoe trench to a 1x1-m unit from 100–150 cm.										

\*Test Unit 1 at 41CV1269 was a 1x0.5-m unit from 80-100 cm and then expanded at the bottom of a backhoe trench to a 1x1-m unit from 100-150 cm.

**Table 95. Comparison of cultural material frequencies for burned rock middens and mounds**

		Middens	Mounds
Tested Features	Total number	12	3
	Excavated m <sup>3</sup>	7.6	1.6
Burned Rocks	Total number	20,947	4,575
	Number per m <sup>3</sup>	2,756	2,859
	Total weight (kg)	3,231	987
	Weight (kg) per m <sup>3</sup>	425	617
Stone Tools*	Total number	151	7
	Number per m <sup>3</sup>	19.9	4.4
Debitage	Total number	3,432	199
	Number per m <sup>3</sup>	452	124
Bones	Total number	252	0
	Number per m <sup>3</sup>	33.2	0
Mussel Shells	Total number	30	0
	Number per m <sup>3</sup>	3.9	0

\*Includes arrow and dart points and all types of chipped and ground stone tools.

tested mounds (see Tables 94 and 95). This same phenomenon was observed by previous investigators. While 221 projectile points were recovered from the 55 middens tested by TRC Mariah, only 7 were recovered from the 18 mounds they tested (Abbott et al. 1996:Table 8.4).

Tables 94 and 95 show that all stone tools and lithic debitage are more common in middens than in mounds. Stone tools were recovered at a rate of 19.9 tools per cubic meter in the 12 middens, while only 4.4 stone tools per cubic meter were found in the 3 mounds (see Table 95). Lithic debitage was similarly distributed, with 452 flakes per cubic meter recovered from middens and only 124 flakes per cubic meter recovered from mounds. Thus, stone tools and debitage are ca. 4.5 and 3.6 times more abundant, respectively, in midden deposits than in mounds. In contrast, data derived from previous investigations show that the density of all lithics per cubic meter is ca. 6.7 times higher at the 55 midden sites than at the 18 mounds (Abbott et al. 1996:Table 8.3). The density of stone tools alone is 11 times higher at middens (18.7 per m<sup>3</sup>) than at mounds (1.7 per m<sup>3</sup>).<sup>5</sup>

<sup>5</sup>These figures are derived by dividing numbers of stone tools by the total volume excavated (see Tables 8.5 and 8.3 in Abbott et al. 1996).

Unmodified bones and mussel shells were recovered from 7 of the 12 middens, but none were recovered from the 3 mounds (see Tables 94 and 95). Preservation conditions may be partly responsible for the absence of bones and shells in the mounds, particularly since 2 of them are in Paluxy settings. Comparable data from previous testing (Abbott et al. 1996:Table 8.3) show that bone and mussel shell densities are much higher at the 55 middens (107 bones and 20 mussel shells per m<sup>3</sup>) than at the 18 mounds (3 bones and 8 mussel shells per m<sup>3</sup>). It is possible that preservation is generally poorer in all mounds as compared to middens; it is reasonable to assume that preservation would be better in midden settings where burial was more rapid and included fine-grained sediments. However, it is also possible that people simply discarded fewer bones and shells at mounds because their activities at these localities were more limited.

Although no carbonized plant remains were identified in flotation samples recovered from the previously tested burned rock mounds, abundant charred plant remains were identified in samples from one of the mounds tested in 1996. The presence of charred remains in Feature 4 at 41CV1093 may be fortuitous (i.e., a fluke of sampling), but another explanation is more likely. Unlike most mounds that are observable on the surface, this mound is almost completely

buried in Paluxy sediments. This may have been a more favorable environment for the preservation of organic remains, but it is notable that another almost completely buried burned rock mound, Feature 2 at 41CV984, yielded no macrobotanical remains. Perhaps the former feature was buried more rapidly than the latter. In any event, the charred wood and nutshell fragments identified in flotation samples from Feature 4 at 41CV1093 support the often suggested idea that burned rock mounds, or "classic burned rock middens," served as plant-processing facilities. Despite the good preservation of macrobotanical remains in the 41CV1093 mound, bones were noticeably absent. This, along with the paucity of stone tools, suggests a rather specialized set of activities, probably related to plant processing, for this burned rock mound.

While the testing data reported herein are rather limited, it appears that the burned rock mounds represent specialized sites where only a limited range of activities occurred. The presence of central hearths within several Fort Hood

mounds supports the idea that they represent accumulations from a single, central cooking pit.

In contrast, the rich and diverse assemblages of cultural remains often recovered from burned rock middens suggest that many of these features were multifunctional and/or associated with intensive occupations. At Fort Hood, it appears that many burned rock middens may have served as generalized cooking features within multifunctional campsites. The large size and irregular shape (i.e., noncircular and often linear) of many Fort Hood middens suggests that these middens represent accumulations of discarded debris from multiple earth ovens rather than a single central roasting pit. While the level of testing done on Fort Hood midden sites to date is not adequate to test this idea, several sites contain large middens where numerous internal hearths may exist (e.g., 41BL155 in Mehalchick et al. 1999; 41CV97 in Abbott and Trierweiler 1995a:367–407; 41CV117 in Trierweiler, ed. 1996:223–233; and 41CV1133 and 41CV1235 in this volume).

# NATIONAL REGISTER EVALUATIONS AND MANAGEMENT RECOMMENDATIONS

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Forty-two prehistoric sites were investigated during the 1996 field season. These sites are evaluated in this chapter relative to the National Register of Historic Places (NRHP) criteria defined in the Fort Hood research design (Ellis et al. 1994). The first section presents the recommendations for NRHP eligibility for all tested sites, as well as recommendations for further work at those sites deemed to be eligible for listing in the NRHP. Under the headings of Paluxy sites, House-Ripstein Creek sites, Cowhouse-Table Rock-Cottonwood Creek sites, and other open sites, site-specific recommendations for NRHP eligibility and for protection and/or data recovery investigations are made. The second section presents programmatic recommendations pertaining to long-term management of cultural resources at Fort Hood.

## RECOMMENDATIONS OF NATIONAL REGISTER ELIGIBILITY AND FURTHER SITE INVESTIGATIONS

The ensuing discussions of site assessments and programmatic recommendations follow the format of site groupings established in Chapters 6–9. Recommendations of NRHP eligibility for the 42 sites are summarized in Table 96.

As discussed below, the 27 sites/subareas recommended as not eligible for listing in the NRHP fail to meet the basic data needs defined in the Fort Hood site significance model. With respect to this model (see data needs questions in Chapter 3), these sites have contextual fatal flaws. The presence of intact and interpretable cultural deposits could not be demonstrated for these sites; consequently, current evidence indicates that these sites have little or no research

potential and warrant no further work.

Twenty-two sites/subareas are recommended as eligible for listing in the NRHP because they have demonstrably good contextual integrity. As summarized in Table 97, all sites/subareas recommended as eligible meet one or more of the four specific essential data needs criteria necessary to demonstrate their research potentials.

The data obtained from each site/subarea recommended as eligible for inclusion in the NRHP are useful to varying degrees for planning a data recovery strategy and/or estimating levels of effort for mitigation. In some cases, such as sites with cultural deposits restricted to spatially limited landforms (e.g., open sites in small alluvial terraces or colluvial benches and rockshelters), site data can provide a sound basis for making a reliable estimate of the level of work required for a comprehensive data recovery excavation. In contrast, the extent of buried components within large alluvial terrace sites is difficult to firmly establish, and the horizontal distribution of artifact concentrations and features within sites is often poorly defined. In these cases, the site data are not sufficient to justify recommending an appropriate level of effort for a data recovery program. Consequently, recommendations for further work at these large sites are limited to suggestions of the appropriate level of intensive testing necessary for planning a data recovery strategy. Table 98 summarizes the recommendations for further work at the 22 sites/subareas recommended as eligible for listing in the NRHP.

### Paluxy Sites

Of the 14 tested sites in Paluxy sediments, 5 are assessed as not eligible and 9 are recommended

**Table 96. Summary of National Register eligibility recommendations**

Site Number	Subarea	Site Grouping	Recommended NRHP Eligibility
41BL340	—	Other Open Site	not eligible
41CV578	Subarea A	House-Ripstein Creek Site	eligible
41CV755	Subarea A	Other Open Site	not eligible
41CV947	—	Paluxy Site	eligible
41CV957	Subarea B	Other Open Site	eligible
41CV984	—	Paluxy Site	eligible
41CV988	Subareas A and B	Paluxy Site	eligible
41CV1012	Subarea B	Cowhouse-Table Rock-Cottonwood Creek Site	not eligible
41CV1030	—	Cowhouse-Table Rock-Cottonwood Creek Site	not eligible
41CV1043	Subarea A	Paluxy Site	not eligible
41CV1048	Subarea C	Cowhouse-Table Rock-Cottonwood Creek Site	eligible
41CV1049	Subarea A	Paluxy Site	eligible
41CV1050	Subarea A	Paluxy Site	not eligible
41CV1092	Feature 2	Other Open Site	not eligible
41CV1093	—	Paluxy Site	eligible
41CV1106	—	Paluxy Site	eligible
41CV1120	—	Cowhouse-Table Rock-Cottonwood Creek Site	eligible
41CV1122	Subarea A	Cowhouse-Table Rock-Cottonwood Creek Site	eligible
	Subarea B	Cowhouse-Table Rock-Cottonwood Creek Site	eligible
41CV1133	—	Cowhouse-Table Rock-Cottonwood Creek Site	eligible
41CV1137	Subarea B	Cowhouse-Table Rock-Cottonwood Creek Site	not eligible
41CV1138	—	Paluxy Site	eligible
41CV1143	Subarea A	Paluxy Site	eligible
41CV1152	Subarea A	Other Open Site	not eligible
	Subarea B	Other Open Site	not eligible
41CV1191	—	Paluxy Site	eligible
41CV1194	—	Paluxy Site	not eligible
41CV1206	Subarea C	Cowhouse-Table Rock-Cottonwood Creek Site	eligible
41CV1211	—	House-Ripstein Creek Site	not eligible
41CV1218	—	House-Ripstein Creek Site	not eligible
41CV1219	Subarea B	House-Ripstein Creek Site	not eligible
41CV1221	Subarea A	House-Ripstein Creek Site	not eligible
	Subarea B	House-Ripstein Creek Site	not eligible
41CV1222	—	House-Ripstein Creek Site	not eligible
41CV1225	Subarea A	House-Ripstein Creek Site	not eligible
41CV1235	—	House-Ripstein Creek Site	eligible
41CV1250	Subarea B	House-Ripstein Creek Site	eligible
41CV1258	Subarea B	Paluxy Site	not eligible
41CV1269	Subarea A	House-Ripstein Creek Site	eligible
	Subarea B	House-Ripstein Creek Site	eligible
41CV1275	Subarea C	House-Ripstein Creek Site	not eligible
41CV1282	Subarea A	House-Ripstein Creek Site	not eligible
41CV1283	Subarea B	Paluxy Site	not eligible
41CV1286	Subarea B	House-Ripstein Creek Site	not eligible
	Subarea C	House-Ripstein Creek Site	eligible
41CV1287	Subarea A	House-Ripstein Creek Site	not eligible
	Subarea B	House-Ripstein Creek Site	not eligible
	Subarea C	House-Ripstein Creek Site	not eligible
41CV1308	Subarea B	House-Ripstein Creek Site	not eligible



**Table 97. Summary of key data needs for National Register-eligible prehistoric sites\***

Site	Subarea	Site Contains				
		Identifiable/ Datable Bones/ Shells	Macrobotanical Remains	Economic/ Chronometric Potential	Multiple Separate Features	Burned Rock Middens/ Mounds
PALUXY SITES						
41CV947	—	yes	yes	yes	yes	no
41CV984	—	no	yes	yes	no	yes
41CV988	Subareas A and B	yes	yes	yes	yes	no
41CV1049	Subarea A	yes	yes	yes	yes	no
41CV1093	—	no	yes	yes	yes	yes
41CV1106	—	no	yes	yes	no	no
41CV1138	—	no	yes	yes	yes	no
41CV1143	Subarea A	no	yes	yes	yes	no
41CV1191	—	yes	yes	yes	yes	yes
HOUSE-RIPSTEIN CREEK SITES						
41CV578	Subarea A	yes	yes	yes	yes	no
41CV1235	—	yes	yes	yes	yes	yes
41CV1250	Subarea B	yes	yes	yes	yes	no
41CV1269	Subarea A	yes	yes	yes	yes	yes
	Subarea B	yes	yes	yes	yes	yes
41CV1286	Subarea C	no	yes	no	no	no
COWHOUSE, TABLE ROCK, AND COTTONWOOD CREEK SITES						
41CV1048	Subarea C	no	yes	yes	no	yes
41CV1120	—	yes	yes	yes	yes	no
41CV1122	Subarea A	yes	yes	yes	yes	yes
	Subarea B	yes	yes	yes	no	yes
41CV1133	—	yes	yes	yes	yes	yes
41CV1206	Subarea C	yes	yes	yes	yes	no
OTHER OPEN SITES						
41CV957	Subarea B	no	yes	yes	no	no

\*Key data needs are those specified by Ellis et al. (1994:187–188) and summarized in Chapter 3.

as eligible for listing in the NRHP (see Table 96). The five ineligible sites (41CV1043, 41CV1050, 41CV1194, 41CV1258, and 41CV1283) were judged to have little or no research potential because no intact cultural deposits were identified during testing. As discussed in Chapter 6, the deposits within all of these sites have been disturbed, primarily by tank traffic. While it is possible that pockets of intact Paluxy sediments containing cultural materials/features are present at some of these sites, the extent of disturbance suggests that locating intact areas would be difficult and expensive. No further work is recommended for these five sites because they can contribute little or no data pertinent to current research issues.

For each of the nine NRHP-eligible Paluxy

sites, at least two of the essential data needs were demonstrated (see Table 97). Because these sites have a high research potential, avoidance and protection would normally be the preferred treatment option under Section 106 of the National Historic Preservation Act. Unfortunately, the culture-bearing deposits at these sites are very shallow (i.e., generally less than a meter thick) and are particularly susceptible to damage or destruction by normal Army training activities involving heavy armored vehicles. Paluxy sites are so vulnerable that they are severely damaged by tanks and other heavy vehicles driving over them. Short of barring all tank traffic in the Paluxy areas on western Fort Hood, avoidance and protection are not viable alternatives. It is recommended that a comprehensive

**Table 98. Recommendations for level of effort for data recovery or intensive testing of National Register-eligible sites**

Site	Subarea	Estimated Size		Backhoe Trenches and Test Units recommended for intensive testing	Recommended hand excavation for data recovery	Analysis Unit to target
		Size LxW	Area (m <sup>2</sup> )			
PALUXY SITES						
41CV947	—	150x135 m	20,250	10 TUs	40–60 m <sup>3</sup>	1
41CV984	—	90x80 m	7,200	none	60–90 m <sup>3</sup>	1
41CV988	A and B	135x115 m	15,525	10 TUs	40–60 m <sup>3</sup>	1
41CV1049	A	130x80 m	10,400	8 TUs	40–60 m <sup>3</sup>	1
41CV1093	—	140x90 m	12,600	8 TUs	55–75 m <sup>3</sup>	1
41CV1106	—	90x60 m	5,400	none	40–60 m <sup>3</sup>	1
41CV1138	—	215x135 m	29,025	5 BHTs, 12 TUs	40–60 m <sup>3</sup>	1
41CV1143	A	85x70 m	5,950	none	40–60 m <sup>3</sup>	1
41CV1191	—	95x85 m	8,075	none	80–100 m <sup>3</sup>	1, 2, and 3
HOUSE-RIPSTEIN CREEK SITES						
41CV578	A	265x95 m	25,175	8 BHTs, 8 TUs	60–100 m <sup>3</sup>	1, 2, and 3
41CV1235	—	315x100 m	31,500	10 BHTs, 10 TUs	60–100 m <sup>3</sup>	1 and 2
41CV1250	B	310x100 m	31,000	10 BHTs, 10 TUs	60–100 m <sup>3</sup>	1 and 2
41CV1269	A	100x30 m	3,000	6 BHTs, 6 TUs	60–100 m <sup>3</sup>	1 and 2
	B	40x25 m	1,000	none	60–100 m <sup>3</sup>	3
41CV1286	C	35x35 m	1,225	none	40 m <sup>3</sup>	2
COWHOUSE-TABLE ROCK-COTTONWOOD CREEK SITES						
41CV1048	C	90x55 m	4,950	none	60–100 m <sup>3</sup>	1
41CV1120	—	50x45 m	2,250	none	60–100 m <sup>3</sup>	1
41CV1122	A and B	75x45 m	3,375	3 BHTs, 3 TUs	150–200 m <sup>3</sup>	1 and 2
41CV1133	—	140x95 m	13,300	none	100–200 m <sup>3</sup>	1
41CV1206	C	310x150 m	46,500	10 BHTs, 10 TUs	60–100 m <sup>3</sup>	1
OTHER OPEN SITES						
41CV957	B	140x40	5,600	none	60–100 m <sup>3</sup>	1

research design and data recovery plan be developed and implemented for investigation of Paluxy sites (see Programmatic Recommendation below). In the absence of such a plan, data recovery at any single Paluxy site would need to consist of one or more excavation blocks totaling ca. 40–60 m<sup>3</sup> of hand excavation. These figures are a gross estimate of excavations needed to yield a statistically valid sample of artifacts and discover and investigate a sample of cultural features.

Table 99 shows how the average artifact density per square meter is calculated for the NRHP-eligible Paluxy sites. While site artifact densities may represent true cultural phenomena, these densities could also be a product of inadequate sampling. Assuming that the highest and lowest artifact densities are aberrant and

should be excluded from consideration, the other seven sites should give a rough idea of the expected artifact recovery from Paluxy sites in general. These sites produced 1,644 stone artifacts, including 82 tools, from 220 excavation levels. Thus, the average stone artifact density for Paluxy sites is 75 specimens per cubic meter, and it may be expected that 3.7 stone tools will be recovered from each cubic meter of sediment excavated. Thus, in order to obtain a statistically valid sample (i.e., a minimum of 200 stone tools), at least 54 m<sup>3</sup> of sediment will need to be excavated at the average Paluxy site. There will be considerable variability in artifact density from site to site, but these data suggest that an excavation block of ca. 40–60 m<sup>3</sup> would be sufficient to obtain an interpretable sample of material culture from most Paluxy sites.

**Table 99. Summary of artifact recovery from Paluxy sites recommended as eligible for listing on the National Register of Historic Places**

Site No.	Total Excavation Levels	Total Stone Artifacts	Stone Artifact Density (per m <sup>3</sup> )	Total Stone Tools	Stone Tool Density (per m <sup>3</sup> )
41CV947	31	148	47.7	8	2.6
41CV984	26	415	159.6	14	5.4
41CV988	35	545	155.7	17	4.9
41CV1049	33	108	32.7	11	3.3
41CV1093	25	251	100.4	9	3.6
41CV1106	32	37	11.6	7	2.2
41CV1138	38	140	36.8	16	4.2
41CV1143	23	3	1.3	1	0.4
41CV1191	47	1,032	219.6	45	9.6
Totals	290	2,679	92.4	128	4.4
Adjusted totals*	220	1,644	74.7	82	3.7

\*Adjusted totals exclude the sites with the highest (41CV1191) and lowest (41CV1143) artifact densities.

In addition to this generalized data recovery sample strategy, three sites warrant mention. Sites 41CV984 and 41CV1093 each contain one burned rock mound. These features are significant in that they have the potential to yield valuable information concerning the formation processes and functions of burned rock mounds and reveal activities associated with them. The depth of these mound deposits is roughly 60 cm at each site; it is estimated that the mound at 41CV984 encompasses ca. 60 m<sup>3</sup> and the mound at 41CV1093 encompasses 15 m<sup>3</sup>. Since the burned rock mounds could be adequately sampled with 30 and 10 m<sup>3</sup>, respectively, the total recommended data recovery efforts, including the nonmound excavation sample, are 60–90 m<sup>3</sup> for 41CV984 and 55–75 m<sup>3</sup> for 41CV1093. Because 41CV1191 contains significant buried cultural deposits in non-Paluxy portions of the site (in addition to the remains in Paluxy sediments), a greater level of effort for data recovery is warranted.

#### House and Ripstein Creek Sites

Of the 20 tested sites/subareas along House and/or Ripstein Creek, 14 are assessed as ineligible for listing in the NRHP (see Table 96). No intact cultural deposits were discovered at these sites. Five sites (six subareas)—41CV578, 41CV1235, 41CV1250, 41CV1269, and 41CV1286—are judged to be eligible for listing in the NRHP.

One or more discrete cultural components from each of these sites contains important archeological data (see Table 97). Avoidance and protection is recommended for these sites. Each site should be protected from vehicular traffic, manual and mechanical excavations (such as foxholes and huldowns), and vandalism. With the exception of Subarea B at 41CV1269 and Subarea C at 41CV1286, the cultural components contained within these sites are not well defined; thus, further testing will be required to estimate the level of effort necessary for complete data recovery. A brief review of the findings and data recovery recommendations for each of these sites follows.

Site 41CV578 contains several intact hearth features at various depths and broadly spatially separated in the alluvial and colluvial deposits of the site. These features represent intact Middle and Late Archaic components. Although the northern and southern site boundaries are defined by House Creek and a Pleistocene terrace, respectively, the eastern and western extent of these buried components is unknown. Therefore, at least eight backhoe trenches and eight test units are needed to further define the extent of the buried components prior to data recovery. Data recovery efforts should focus on the identified occupation zones in the vicinity of Backhoe Trenches 1, 3, 4, and 5 if no significant buried remains are encountered in the additional testing.

Site 41CV1235 contains a burned rock midden

buried within an alluvial terrace and colluvial toeslope. Intact features were found in the midden matrix and in the sediments below and adjacent to the midden. The extent of the midden is relatively well defined, and it represents an accumulation of burned rocks during the Middle to Late Archaic periods. The extent and significance of buried cultural components around the midden are not well defined, and at least 10 backhoe trenches and 10 test units are needed to establish the horizontal and vertical extent of the buried cultural remains in the nonmidden areas. Data recovery efforts should focus on excavating the burned rock midden and defining the activities in the vicinity of the midden. Mechanical stripping of sterile zones would be beneficial to facilitate data recovery excavations.

Site 41CV1250 contains intact Late Prehistoric (Austin and Toyah phase) components buried in a floodplain terrace of House Creek. Although the terrace is relatively small, the extent of the components within it are not well defined horizontally. Also, the terrace (T<sub>1</sub>) farther away from House Creek was only minimally tested and may also contain intact cultural deposits. At least eight backhoe trenches and eight test units are needed to better define the extent of the buried components and to investigate the higher terrace deposits. Data recovery excavations should focus on the vicinity of Backhoe Trench 3 and Test Unit 1 unless more-significant deposits are encountered in additional testing. Mechanical stripping may be helpful to facilitate data recovery of the buried components.

Subarea A at 41CV1269 contains a heavily disturbed burned rock midden buried within alluvial and colluvial sediments. Some portions of the midden, however, remain intact. An undisturbed hearth was discovered in the sediments below the midden, and a relatively high frequency of artifacts were found just west of the midden. Although the intact portion of the midden is fairly small, the horizontal extent and relationships between various components are not well defined. Six additional backhoe trenches and six test units are recommended to better define the nature and extent of the buried components. Data recovery excavations should focus on the area around Backhoe Trenches 2 and 3 unless more-promising cultural deposits are encountered in additional testing. Mechanical stripping of sterile sediments should be employed

to facilitate data recovery.

Subarea B at 41CV1269 contains a burned rock midden buried from 20 to 83 cm within a colluvial bench. In addition to a large quantity of cultural materials apparently representing Late Archaic and Late Prehistoric components, an internal slab-lined hearth or earth oven was found within the midden. Although the maximum size of the midden is 25x20 m, approximately one-third of it has been vandalized. Data recovery should consist of a large block excavation in the intact portions of the midden.

Subarea C at 41CV1286 contains a discrete Toyah component shallowly buried in an alluvial terrace. The 35x35-m-area containing this component is relatively small; the cultural zone is only a few centimeters thick and is contained within the upper 30–40 cm. A comprehensive data recovery effort involving 100 hand excavated 1x1-m units would provide a sample sufficient for defining intrasite activity patterning but would only require an excavation effort of 40 m<sup>3</sup>. Data recovery excavations should concentrate on the area around Test Units 3, 8, and 9, but some additional prospection in the vicinity of Test Unit 7 also is warranted.

#### **Cowhouse, Table Rock, and Cottonwood Creek Sites**

Within this group of sites (n = 8), 41CV1012, 41CV1030, and 41CV1137 are recommended as ineligible for listing in the NRHP (see Table 96). Site 41CV1012 has been completely disturbed by earthmoving machinery, and 41CV1030 and 41CV1137 yielded sparse amounts of cultural materials with little meaningful context. The other five—41CV1048, 41CV1120, 41CV1122, 41CV1133, and 41CV1206—are recommended as eligible for listing in the NRHP and contain important research data (see Table 97). Avoidance and protection are recommended for these sites; if avoidance is not possible, intensive testing and/or data recovery excavations are warranted (see Table 98). A brief review of the findings and data recovery recommendations for each of these sites follows.

Site 41CV1048 contains a burned rock midden shallowly buried in the sediments along a small tributary of Cottonwood Creek. Although a tank trail exposes part of the east edge of this feature, it has not been vandalized. The horizontal and vertical extent of this portion of the

site are well defined; the base of the midden is no more than 70 cm deep, and it is estimated to be 15x13 m in size. Although mechanical stripping of the small terrace adjacent to the midden could be employed to expose any buried cultural deposits that might be associated, a large block excavation is recommended for data recovery in the midden.

Site 41CV1120 contains at least two Late Archaic components, buried at approximately 55–70 cm and 80–90 in an alluvial terrace of Table Rock Creek. The vertical and horizontal extent of these components was adequately defined through testing. Assuming that mechanical stripping of overburden was employed to remove the upper ca. 50 cm of deposits, a data recovery excavation block of 150 m<sup>2</sup> would require only 75 m<sup>3</sup> of hand excavation.

Site 41CV1122 contains discrete, stratified Middle and Late Archaic cultural components with relatively large amounts of associated artifacts. The two subareas contain components buried at various depths from the surface to approximately 170 cm, including two burned rock middens. Three additional backhoe trenches and three test units should be excavated to determine the most favorable location for locating an excavation block (or blocks) in the vicinity of Backhoe Trenches 1 and 2 and Test Units 1 and 2. If mechanical stripping were employed to remove sterile fill between cultural deposits, an estimated 100 cm of cultural deposits within each 1x1-m unit would still need to be hand excavated. Consequently, a relatively large amount of excavation, ca. 150–200 m<sup>3</sup>, is needed at this site to provide an adequate data recovery sample for comparison of multiple components.

Site 41CV1133 contains an intact burned rock midden buried in the upper 80 cm of alluvial deposits in an extensive terrace of Table Rock Creek. This site contains one of the few burned rock middens on Fort Hood without any evidence of vandalism. An intact slab-lined hearth or oven was found in the midden, which apparently represents Late Archaic into Late Prehistoric occupations. Although the short axis and vertical extent of the midden are fairly well established, the total length of its long axis is not known. In addition, stratigraphically isolable cultural zones may be present around the midden. This midden could be productively

investigated using both mechanical stripping and hand excavation, as advocated by Black et al. (1997:312) in their treatise on “hot rock cooking” on the Edwards Plateau. Excavation at the midden should focus on exposing large areas to document midden structure. Observations of numerous burned rock middens at Fort Hood suggest that this site may indeed contain multiple internal hearths (or earth oven beds) buried over a large area. In such a setting, searching for and carefully investigating such internal features is the most productive approach to understanding how and why the midden formed over time. While it is important to adequately sample and characterize the midden matrix, the mitigative efforts should focus on internal features because they represent discrete activities or events, contain organic remains that are datable and provide chronological control, and often yield interpretable and coherent assemblages of associated artifacts and macrobotanical and faunal remains.

An investigative strategy combining mechanical excavation using a Gradall and hand-excavated units would be especially appropriate for the midden at 41CV1133. Additional backhoe trenches and test units are needed to expose a large area around the large internal hearth (Feature 2) that is already identified. A 5x5-m block excavated to 80 cm below surface is sufficient for this and would also provide a large sample of the midden matrix. Additional isolated units should be excavated across the midden to provide a broader random sample of the midden matrix. A Gradall could be used to provide accurate and careful horizontal control while stripping sediments to search for other intact internal features within the midden. This is a cost-effective method of exposing the entire midden and some of the surrounding sediments. By getting a direct or oblique overhead view of the stripped area, it is easy to recognize the internal structure of the midden and the smaller features within it. Each smaller feature would then be excavated by hand. At least 100–150 m<sup>3</sup> of hand excavation would be needed for this type of data recovery effort at 41CV1133.

Alternative, nondestructive approaches to identifying internal midden structure might also be given some consideration. Because the midden at 41CV1133 is generally shallow (i.e., in the upper 50 cm of deposits), completely

undisturbed, and situated within a confined area on an open (i.e., not densely vegetated) terrace, some type of remote sensing might be effective for locating internal features (generally composed of large rocks) within the midden matrix (composed of smaller fire-cracked rocks). This site might be a good test case for attempting nondestructive surveys using a proton magnetometer, electric resistivity, ground penetrating radar, or other remote sensing techniques (e.g., Abbott and Frederick 1990).

Subarea C of 41CV1206 contains intact features and artifacts in a stratified context within Fort Hood alluvium. A large block excavation will be needed to sample the target cultural zones, which are buried at a depth of ca. 1.2–2.2 m. Mechanical stripping of overburden could facilitate the hand excavation of Middle Archaic components at this site.

### **Other Open Sites**

Four of the five other open sites (41BL340, 41CV755, 41CV1092, and 41CV1152) are recommended as not eligible for listing in the NRHP, while one site, 41CV957, is recommended as eligible (see Table 96). This site contains a large quantity of artifacts associated with a midden representing repeated Late Archaic occupations, and an intact internal feature (i.e., a slab-lined hearth or baking pit) was found within the midden. Because the horizontal and vertical extent of these cultural deposits are well defined, no additional testing would be needed prior to data recovery. Data recovery at 41CV957 would be comparable to data recovery at most of the House-Ripstein Creek or Cowhouse-Table Rock-Cottonwood Creek sites (see Table 98).

## **PROGRAMMATIC RECOMMENDATIONS**

### **Paluxy Sites**

While many open sites in alluvial valleys have cultural deposits buried deeply enough to be protected from regular Army training activities, Paluxy sites are characterized by shallowly buried cultural deposits in an extremely erodable environment. Almost every Paluxy site on Fort Hood has been damaged by vehicle traffic to some extent, and many have already been

totally disturbed by regular Army training activities.<sup>6</sup> Of the 22 Paluxy sites that have been tested to date (8 by Mariah Associates and 14 by Prewitt and Associates), for example, 86.3 percent ( $n = 19$ ) of them have been moderately to severely damaged or destroyed by military vehicles. A medium to high degree of vehicle impacts was documented for 54 percent of the 897 sites examined by Mariah Associates between 1991 and 1994 (Trierweiler, ed. 1994: Table 9.17). If the current pattern of land use and intensity of armored vehicle training continues, which is almost a certainty, it is likely that all of the National Register-eligible Paluxy sites will eventually be severely damaged or destroyed. Data recovery is the only viable alternative for managing these sites, short of making entire training areas off limits to armored vehicles. It is recommended that a comprehensive Paluxy sites research design and data recovery plan be developed and implemented as soon as possible. These sites occupy a unique location on the landscape; the setting constitutes an unusual ecological niche found only where Paluxy sands crop out. Following the ecological approach to hunter-gatherer site research espoused by Ellis et al. (1994), a wide range of research questions can be formulated relating specifically to human behavior within the Paluxy environment.

### **National Register-Eligible Prehistoric Sites**

Except for occasional accidental discoveries of new sites, the inventory of prehistoric sites on Fort Hood has been largely completed and

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<sup>6</sup>At least three National Register-eligible Paluxy sites have been disturbed by activities not related to Army training since 1996. Site 41CV595, tested by Mariah Associates in 1993 and recommended as NRHP eligible (Abbott and Trierweiler 1995:472–483), was virtually destroyed when the Army bulldozed a firebreak to fight a massive range fire in February of 1996. Paluxy sites 41CV984 and 41CV988 were both severely damaged during cedar-clearing activities in late 1997/early 1998. The conditions of these sites as described in Chapter 6 do not reflect these recent impacts, and no assessment of the extent of the damages has been made.

the number of sites now stands at 1,094 (as of April 1998). Since 1991, most sites with any research potential have been investigated beyond their initial recording to determine their eligibility for listing in the National Register of Historic Places. The geomorphic contexts of 601 sites were assessed (571 by Mariah Associates and 30 by Prewitt and Associates), and the deposits at each site were shovel tested if necessary. This information was used to determine the potential for preservation of buried archeological remains. Some sites were evaluated as eligible or not eligible for the NRHP based on the geoarcheological assessment and/or shovel testing results. However, many of the sites had research potential but needed more testing. Additional National Register testing has been completed for 196 of these sites (113 by Mariah Associates and 83 by Prewitt and Associates); this process is ongoing, but is rapidly nearing completion. The inventory of NRHP-eligible prehistoric sites currently stands at 163 (as of April 1998).

National Register-eligible sites subject to potential impacts from special military activities or projects must be dealt with on a case-by-case basis, but the entire prehistoric database must be considered as well. The next step in managing the pool of NRHP-eligible prehistoric sites under Section 106 of the National Historic Preservation Act is to assess the types and intensity of impacts occurring as a result of regular military training, illegal vandalism, and/or other ongoing activities. A determination of effect must be made for various classes of prehistoric resources before appropriate treatment can be recommended. What is missing from this scenario is a comprehensive plan for the management of NRHP-eligible prehistoric resources.

Prewitt and Associates recommends that a long-term plan for dealing with prehistoric resources on Fort Hood be developed. This plan should build on the ecologically oriented approach to hunter-gatherer site research in the existing research design developed by Ellis et al. (1994), but it must go much further. Sites must be grouped into classes based on location (i.e., geographic and/or geomorphic setting) and inferred function in order to place them in their proper theoretical perspectives. Appropriate field and analysis strategies should be developed as part of this plan in order to identify how to derive the maximum amount of significant

archeological data (with significance being measured relative to the research design) from each class of site. Once such investigative strategies are devised and in place, data recovery efforts can be quickly implemented, even in emergency situations.

The resource management plan must also identify current conditions for each site class, and the nature and intensity of ongoing impacts must be documented and quantified as far as practical. Once the continual threats to each site group have been identified, data recovery efforts to mitigate the most endangered sites can begin. For some site classes, such as those with deeply buried stratified deposits in alluvial settings, a data recovery program will be unnecessary if they can be preserved in situ. For other classes of sites, the threats of damage and destruction are so serious that data recovery efforts will need to begin as soon as possible. Previous researchers realized that rockshelters, burned rock mounds and middens, and shallowly buried open sites (especially Paluxy sites) on Fort Hood are extremely endangered—primarily by vehicle traffic and vandalism—and should be given immediate attention (Abbott 1994b:346–347, 1994c:323–325, 1995b:842; Briuer and Bradle 1986; Briuer and Niquette 1983; Carlson 1993a:1, 118, 1993b:1; Carlson and Briuer 1986:25–28; Carlson et al. 1986:93; Dibble and Briuer 1989:16–28; Dibble et al. 1989:27–33; Mehalchick et al. 1999; Mueller-Wille and Carlson 1990b:109–111, 126, 135–137; Skinner et al. 1981:47–59; Skinner et al. 1984:64; Trierweiler 1996:650). Countless observations of site conditions and types of impacts have been made, and controlled impact studies, site monitoring programs, and site protective measures have been done sporadically over the past two decades. These observations and studies clearly show that large numbers of sites on Fort Hood are being severely damaged and destroyed, primarily by military vehicle traffic and vandalism. The evidence also shows that (1) vandalism continues to occur frequently to certain kinds of sites (i.e., rockshelters and burned rock middens) independent of military training activities or ease of site access; (2) the location of military training activities changes through time and is not predictable in the long run; (3) the intensity of military training activities has generally increased as the number of troops on Fort Hood has increased in recent years; and (4) protective

measures implemented to date have been largely ineffective. Many archeologists have noted the destruction of vulnerable sites, and it is clear that a realistic plan needs to be formulated.

Information available in published reports is more than adequate for identifying such vulnerable sites, and thus a plan of action should be developed and implemented.



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**APPENDIX A: Summary and Evaluation of  
Radiocarbon Dates and Amino  
Acid Epimerization Analysis of  
Snail Shells**

Douglas K. Boyd

## RADIOCARBON DATES

Sixty-two charred material or bulk sediment samples from cultural and noncultural contexts at 26 archeological sites were radiocarbon dated by Beta Analytic, Inc., of Miami, Florida. Sixty-four samples were submitted for assay, but two samples thought to be charcoal (from 41CV578) yielded an insufficient quantity of charred remains, even for radiocarbon assay using the accelerator mass spectrometer (AMS) method. The 62 radiocarbon assays are summarized by site group, dated materials, and dating technique in Table 100. The majority of the radiocarbon dates ( $n = 49$ , 79.0 percent) were obtained on charred materials (mostly wood charcoal), while the other 13 (21.0 percent) were derived from organic remains in bulk sediment. Fifty of the 62 samples (80.6 percent) were dated using the AMS method.

Table 101 presents laboratory sample numbers, dated material, site and provenience designations, conventional radiocarbon age and  $\delta^{13}\text{C}$  value in ‰, and calibrated calendrical dates (1-sigma range) for each of the 62 samples. All standard radiometric assays were done by Beta Analytic. The AMS assays were done by one of Beta Analytic's collaborating laboratories, either the Lawrence Livermore National Laboratory in Berkeley, California, or the Centre for Isotope Research, University of Groningen, in the Netherlands. Several of the charcoal samples assayed by the standard radiometric method were very small and required extended counting time. Several of the sediment samples had a low carbon content and required special processing.

The conventional radiocarbon ages ( $\delta^{13}\text{C}$ -corrected ages) are reported in radiocarbon years before present (RCYBP), where present is

A.D. 1950. They were calculated using the Libby  $^{14}\text{C}$  half-life of 5,568 years. The  $^{13}\text{C}/^{12}\text{C}$  ratios are relative to the PDB-1 international standard, and RCYBP ages are normalized to -25 per mil. All but one of the conventional radiocarbon ages were tree-ring calibrated by Beta Analytic using the Pretoria calibration curve (Vogel et al. 1993). The exception was a sediment sample from 41CV1275, which yielded a conventional radiocarbon age that was too old to be calibrated by this method. This assay (Beta-102147) was calibrated with the CALIB 3.0 computer program (Stuiver and Reimer 1993), using the coral calibration dataset of Bard et al. (1993).

## AMINO ACID EPIMERIZATION ANALYSIS OF SNAIL SHELLS

Two *Rabdotus* snail shells from 41CV1275 were submitted to Dr. Glen Goodfriend at the Geophysical Laboratory, Carnegie Institution of Washington for amino acid epimerization analysis. The two samples were collected from the Analysis Unit 3 cultural zone (i.e., stratigraphic zone 2) in Backhoe Trench 13. These samples were selected because of association with a cultural zone presumed to be of early to middle Holocene age. The intent was to use the A/I ratios to determine if both of the snails were in good stratigraphic context and then to select one of the snails for AMS radiocarbon dating. The following A/I ratios were obtained:

Sample	Provenience	A/I Ratio
CD-712	Backhoe Trench 13, 63 cm	0.175
CD-713	Backhoe Trench 13, 81 cm	0.165

Both A/I ratios fell close to the expected values for early to middle Holocene-age snails. The

**Table 100. Summary of radiocarbon assays by site group, dated material, and dating technique**

Site Group (number of sites with assays)	Charred Material		Organics in Sediment		Snail Shell (AMS)	Totals
	Standard	AMS	Standard	AMS		
Paluxy Sites ( $n = 11$ )	3	13	1	1	0	18
House-Ripstein Creeks Sites ( $n = 8$ )	1	17	4	4	1	27
Cowhouse, Table Rock, Cottonwood Creeks Sites ( $n = 6$ )	1	13	2	0	0	16
Other Sites ( $n = 1$ )	0	1	0	0	0	1
Totals ( $n = 26$ )	5	44	7	5	1	62

Table 101. Summary of radiocarbon dates, Fort Hood 1996 prehistoric site testing

Beta Sample*	Sample Material	Site and Analysis Unit	Sample Provenience (Test Unit, cmbs)	Feature Association	Conventional Age B.P. (δ13C)	Calibrated Calendrical Date, 1-Sigma Range with (Intercepts)	Wood Identification
Beta-102090-G	charcoal	41CV947 (AU 1)	Test Unit 1, 45-58	Feature 2	1880 ± 40 (-22.5)	A.D. 90 (130) 210	Quercus sp.
Beta-102091-G	charcoal	41CV947 (AU 1)	Test Unit 3, 15-20	Feature 1	1370 ± 50 (-30.2)	A.D. 645 (665) 685	-
Beta-102092	charcoal x	41CV984 (AU 1)	Test Unit 3, 30	none	1130 ± 80 (-30.4)	A.D. 855 (905, 920, 950) 1000	-
Beta-102093-G	charcoal	41CV984 (AU 1)	Test Unit 1, 40-50	Feature 2	2750 ± 40 (-23.4)	915 (890) 830 B.C.	-
Beta-102094-G	charcoal	41CV988 (AU 1)	Test Unit 1, 37	Feature 2A	1280 ± 40 (-24.5)	A.D. 685 (720, 735, 760) 785	-
Beta-102095-G	charcoal	41CV988 (AU 1)	Test Unit 8, 27	Feature 4	1230 ± 40 (-25.9)	A.D. 770 (790) 875	Quercus sp.
Beta-102096	charcoal x	41CV1049 (AU 1)	Test Unit 2, 45-51	Feature 7	1590 ± 50 (-26.0)	A.D. 420 (450) 550	Quercus sp.
Beta-102097	charcoal x	41CV1049 (AU 1)	Test Unit 3, 28-32	Feature 1A	1600 ± 100 (-24.7)	A.D. 380 (440) 590	-
Beta-102098-G	charcoal	41CV1093 (AU 1)	Test Unit 1, 43-49	Feature 4	1420 ± 40 (-24.7)	A.D. 620 (645) 660	-
Beta-102099-G	charcoal	41CV1106 (AU 1)	Test Unit 3, 60-63	Feature 4	390 ± 40 (-24.6)	A.D. 1450 (1475) 1515, 1585-1625	-
Beta-102100-G	charcoal	41CV1138 (AU 1)	Test Unit 3, 38	Feature 1	2460 ± 40 (-25.8)	760-635, 560 (525) 415 B.C.	-
Beta-102101-G	charcoal	41CV1143 (AU 1)	Test Unit 1, 19-21	Feature 1A	1200 ± 40 (-27.0)	A.D. 785 (865) 885	-
Beta-102102-G	charcoal	41CV1143 (AU 1)	Test Unit 2, 35-43	Feature 6	2210 ± 40 (-23.5)	365 (345, 310, 210) 190 B.C.	-
Beta-102103-G	charcoal	41CV1191 (AU 1)	Test Unit 4, 30-40	Feature 1	3200 ± 50 (-26.7)	1510 (1440) 1415 B.C.	-
Beta-102104-G	charcoal	41CV1191 (AU 1)	Test Unit 3, 31-38	Feature 2	1630 ± 40 (-24.1)	A.D. 405 (425) 450	-
Beta-102105-G	sediment	41CV1194 (AU 2)	Test Unit 1, 137-148	Feature 2	4150 ± 50 (-24.7)	2875 (2860, 2815) 2790, 2780 (2680) 2605 B.C.	-
Beta-102106-G	charcoal	41CV1258 (AU 1)	Test Unit 3-4, 30-35	Feature 4	1850 ± 40 (-26.5)	A.D. 120 (160) 235	-
Beta-102107	sediment xx	41CV1258 (AU 1)	Test Unit 3, 71-81	none	2210 ± 60 (-19.7)	375 (345, 310, 210) 180 B.C.	-
Beta-102108-G	charcoal	41CV957 (AU 1)	Test Unit 1, 32-36	Feature 3	3160 ± 40 (-24.3)	1440 (1420) 1400 B.C.	-
Beta-102109	charcoal x	41CV1030 (AU 2)	Test Unit 8, 146-160	Feature 2	160 ± 60 (-25.7)	A.D. 1655 (1680, 1745, 1805, 1935) 1950	Celtis laevigata
Beta-102110-G	charcoal	41CV1048 (AU 1)	Test Unit 2, 50-60	Feature 1	3920 ± 50 (-27.5)	2470 (2450) 2325 B.C.	-
Beta-102111-G	charcoal	41CV1120 (AU 1)	Test Unit 3, 80-82	Feature 2	3070 ± 50 (-25.4)	1400 (1315) 1265 B.C.	-
Beta-102112	sediment xx	41CV1120 (AU 1)	Backhoe Trench 1, 197-207, Zone 5	none	4790 ± 80 (-20.0)	3655 (3630) 3510, 3410-3395 B.C.	-
Beta-102113-G	charcoal	41CV1122 (AU 2)	Test Unit 2, 102-129	Feature 4	5090 ± 50 (-26.3)	3960 (3940, 3845, 3830) 3800 B.C.	-
Beta-102114-G	charcoal	41CV1122 (AU 2)	Test Unit 1, 151	none	5090 ± 70 (-33.7)	3970 (3940, 3845, 3830) 3790 B.C.	-
Beta-102115-G	charcoal	41CV1122 (AU 1)	Test Unit 3, 20-30	Feature 1	3000 ± 40 (-27.1)	1285 (1250) 1145 B.C.	-
Beta-102116-G	charcoal	41CV1122 (AU 1)	Test Unit 2, 70-80	Feature 2	3060 ± 40 (-24.7)	1390 (1305) 1265 B.C.	-
Beta-102117-G	charcoal	41CV1122 (AU 1)	Test Unit 1, 70-80	Feature 3	3520 ± 40 (-26.8)	1895 (1875, 1805, 1795) 1760 B.C.	-
Beta-102118-G	charcoal	41CV1122 (AU 2)	Test Unit 1, 80-90	Feature 5	4140 ± 50 (-11.5)	2870 (2855, 2820) 2795, 2770 (2665) 2595 B.C.	-
Beta-102119-G	charcoal	41CV1133 (AU 1)	Test Unit 2, 79	none	2900 ± 40 (-26.5)	1130 (1045) 1005 B.C.	-
Beta-102120-G	charcoal	41CV1133 (AU 1)	Test Unit 1, 20-34	Feature 2	1160 ± 40 (-26.1)	A.D. 865 (885) 960	-
Beta-102121-G	charcoal	41CV1133 (AU 1)	Test Unit 1, 60-70	Feature 1	3280 ± 40 (-24.5)	1605 (1525) 1505 B.C.	-
Beta-102122-L	charcoal	41CV1206 (AU 1)	Test Unit 1, 193	Feature 2	4110 ± 50 (-27.7)	2865-2810, 2695 (2610) 2580 B.C.	-
Beta-102123-G	charcoal	41CV1206 (AU 1)	Test Unit 1, 201-203	Feature 3	4120 ± 50 (-25.0)	2865 (2845, 2830) 2805, 2750-2720, 2705 (2620) 2585 B.C.	-
Beta-102124	sediment xx	41CV1206 (AU 1)	Backhoe Trench 2, 101-110	none	1140 ± 60 (-13.8)	A.D. 865 (895) 985	-

Table 101, continued

Beta Sample	Sample Material	Site and Analysis Unit	Sample Provenience (Test Unit, embs)	Feature Association	Conventional Age B.P. (813C)	Calibrated Calendrical Date, 1-Sigma Range with (Intercepts)	Wood Identification
Not dated	charcoal	41CV578 (AU 2)	Backhoe Trench 2, 264	none	NA	NA	Not analyzed
Not dated	charcoal	41CV578 (AU 2)	Cutbank, 120	Feature 3	NA	NA	Not analyzed
Beta-102127-G	sediment**	41CV578 (AU 2)	Test Unit 3, 102-106	Feature 7	4810 ± 50 (-29.7)	3650 (3635) 3615, 3580-3530 B.C.	-
Beta-102128-G	charcoal	41CV578 (AU 1)	Test Unit 4, 134-135	Feature 9	1480 ± 40 (-27.7)	AD. 560 (605) 635	Quercus sp.
Beta-102129-G	charcoal	41CV578 (AU 2)	Test Unit 1, 130-140	Feature 5	3710 ± 50 (-26.9)	2145 (2120, 2080, 2050) 2015 B.C.	-
Beta-102130-G	charcoal	41CV1221 (AU 1)	Test Unit 5, 80-90	none	180 ± 40 (-25.4)	AD. 1665 (1675) 1690, 1735 (1770, 1800) 1815, 1925 (1940) 1950	-
Beta-102131-G	charcoal	41CV1235 (AU 2)	Test Unit 3, 171	Feature 3	4600 ± 50 (-29.0)	3370 (3355) 3340 B.C.	-
Beta-102132-G	charcoal	41CV1235 (AU 1)	Test Unit 2, 70-76	Feature 1	3850 ± 50 (-25.0)	2400 (2300) 2205 B.C.	-
Beta-102133-G	charcoal	41CV1235 (AU 2)	Test Unit 1, 79-90	Feature 5	4120 ± 50 (-24.2)	2865 (2845, 2830) 2805, 2750-2720, 2705 (2620) 2585 B.C.	-
Beta-102134-G	charcoal	41CV1235 (AU 1)	Test Unit 5, 46-60	Feature 4	3110 ± 50 (-24.3)	1420 (1395) 1305 B.C.	-
Beta-102135-G	charcoal	41CV1235 (AU 2)	Test Unit 1, 110-125	Feature 7	4490 ± 50 (-23.7)	3335 (3285, 3245, 3105) 3070 B.C.	-
Beta-102136-G	charcoal	41CV1250 (AU 2)	Test Unit 2, 140-145	Feature 5	1210 ± 40 (-25.1)	AD. 780 (855) 885	Quercus sp.
Beta-102137	charcoal	41CV1250 (AU 1)	Test Unit 1, 70-80	Feature 4	590 ± 50 (-26.2)	AD. 1310-1365, 1375 (1400) 1415	Quercus sp.
Beta-102138-G	charcoal	41CV1250 (AU 2)	Test Unit 1, 117	Feature 7	1130 ± 40 (-25.0)	AD. 885 (905, 920, 950) 980	-
Not Sent	charcoal	41CV1250 (AU 2)	Test Unit 2, 143-148	Feature 6	NA	NA	Sample missing
Beta-102139-L	charcoal	41CV1269 (AU 1)	Test Unit 2, 170-175	Feature 3	3720 ± 50 (-23.7)	2175 (2125, 2065, 2060) 2025 B.C.	Indeterminate
Beta-102140-L	charcoal	41CV1269 (AU 1)	Test Unit 1, 60-70	none	2520 ± 40 (-24.3)	785 (770) 755, 685-540 B.C.	sp., Quercus
Beta-102141-L	charcoal	41CV1269 (AU 1)	Test Unit 1, 140-150	Feature 1	3690 ± 50 (-26.0)	2135 (2035) 1975 B.C.	sp., and
Beta-102142-L	charcoal	41CV1269 (AU 2)	Test Unit 4, 20-30	Feature 2	720 ± 50 (-25.9)	AD. 1270 (1285) 1300	Juniperus sp.
Beta-102143-L	charcoal	41CV1269 (AU 2)	Test Unit 4, 60-70	Feature 6	2560 ± 50 (-25.5)	800 (785) 765, 615-600 B.C.	-
Beta-102144-L	charcoal	41CV1269 (AU 1)	Test Unit 3, 170-180	Feature 5	3750 ± 50 (-27.5)	2205 (2140) 2110, 2090-2040 B.C.	-
Beta-102145	sediment xx	41CV1275 (AU 1)	Backhoe Trench 5, 100-109	none	910 ± 60 (-15.7)	AD. 1035 (1165) 1215	-
Beta-102146-L	sediment	41CV1275 (AU 1)	Backhoe Trench 6, 156-162	none	9550 ± 50 (-22.2)	8915-8780, 8685 (8610) 8555 B.C.	-
Beta-102147-L	sediment	41CV1275 (AU 1)	Backhoe Trench 9, 225-230	none	11,170 ± 50 (-20.3)	11,200 (11,129) 11,060 B.C.***	-
Beta-102148	sediment	41CV1275 (AU 1)	Cutbank, 158-164	none	2060 ± 80 (-20.6)	175 (45) B.C. AD. 45	-
Beta-102149-L	charcoal	41CV1286 (AU 2)	Test Unit 3, 35	living surface	440 ± 40 (-25)	AD. 1435 (1450) 1470	-
Beta-102150	sediment xx	41CV1286 (AU 2)	Backhoe Trench 4, 252-260	none	3720 ± 70 (-17.5)	2195 (2125, 2065, 2060) 1985 B.C.	-
Beta-102151	sediment xx	41CV1308 (AU 1)	Backhoe Trench 1, 126-134	none	1510 ± 80 (-20.1)	AD. 450 (575) 640	-
Beta-106151	sediment	41CV1275 (AU 3)	Backhoe Trench 13, 45-50	Feature 5	1980 ± 40 (-18.2)	5 B.C. (45 A.D.) 75	-
Beta-106967-L	snail shell	41CV1275 (AU 3)	Backhoe Trench 13, 63	none	2420 ± 40 (-8.7)	525 (415) 405 B.C.	-

\* AMS radiocarbon dates indicated by:

G = Centre for Isotope Research, University of Groningen, Netherlands

L = Lawrence Livermore National Laboratory, Berkeley, California

\*\* Sample processed using SEM

\*\*\* Date calibrated using CALIB 3.0

x Small sample requiring extended counting time

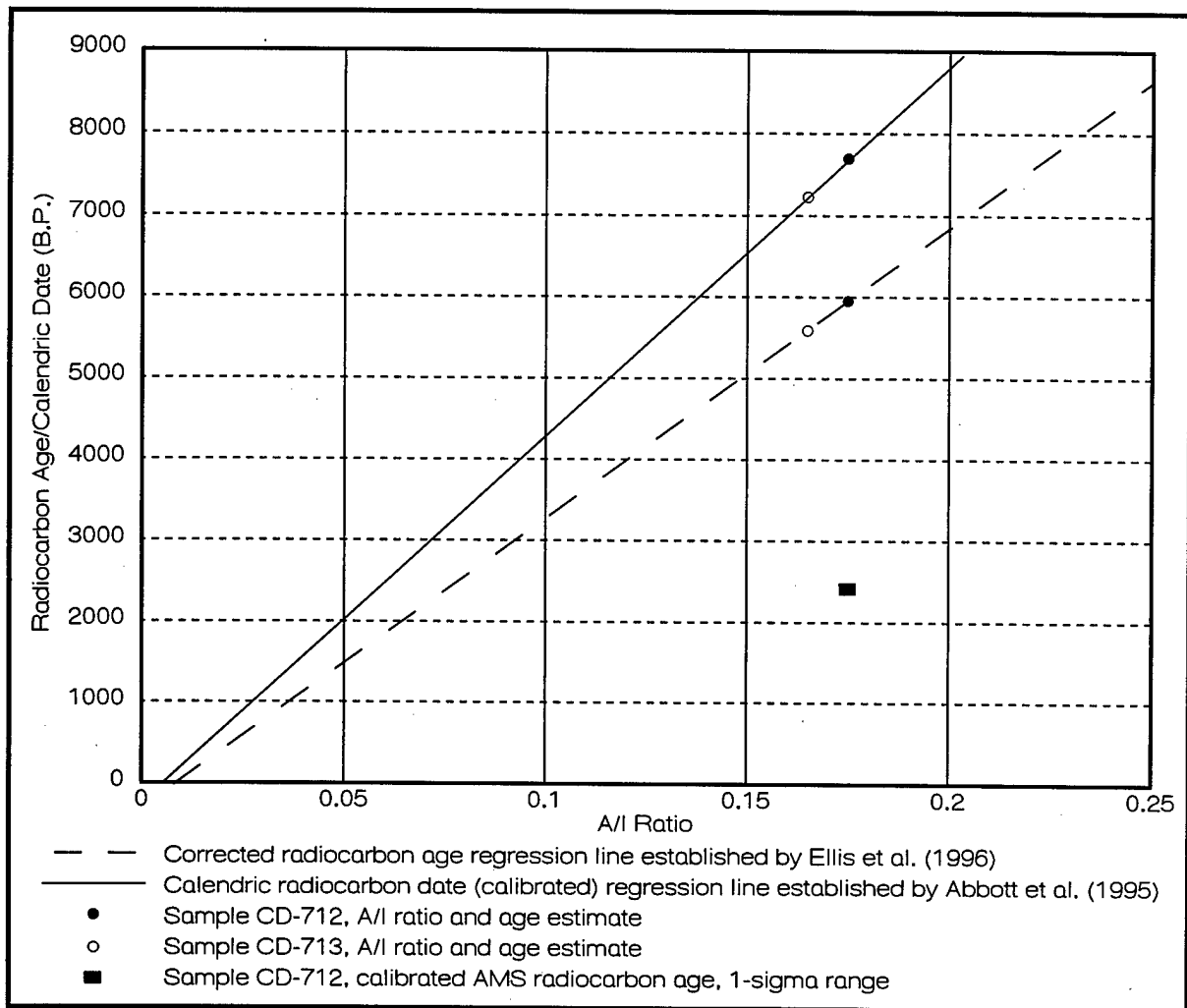
xx Low carbon sediment requiring special handling

approximate age of these specimens was derived using the regression formulas established during previous amino acid epimerization studies by TRC Mariah (Table 102). Since Regression Formula 2 (see Ellis et al. 1996) is applicable only for specimens younger than 5,000 years, the older radiocarbon age equivalents were calculated using Regression Formula 1 (see Abbott et al. 1995) are preferred.

When viewed graphically, the comparison of A/I ratios to calendric (calibrated) radiocarbon dates suggests that both snail shells are between ca. 7,000 and 8,000 years old (Figure 153).

Sample CD-712 was then sent to Beta Analytic for AMS radiocarbon dating (see Table 101,

Beta-106967-L). The resulting corrected radiocarbon age is  $2420 \pm 40$  B.P., and the 1-sigma calibrated age range is 2475–2355 B.P. This AMS age estimate does not correspond with either the corrected or calibrated radiocarbon age equivalents based on A/I ratios. The results are off by as much as 3,500 years or more, indicating that the snail A/I ratio is completely inaccurate. The probable cause for this extreme error is that the snail shell was heated. Intensive heating of shells seems to be the primary culprit for causing high A/I ratios that deviate from AMS radiocarbon ages, and intensive heating of shells does not always leave visible evidence (e.g., thermal discoloration) (Ellis et al. 1996:203).



**Figure 153.** Relationships between A/I ratios, corrected AMS radiocarbon ages, and calendric (calibrated) radiocarbon dates for snails from 41CV1275. The actual corrected radiocarbon age and calendric date (calibrated) for sample CD-712 also are shown.

Table 102. Radiocarbon age equivalent of snail A/I ratios, 41CV1275

Sample Number	Radiocarbon Age Equivalent	
	Corrected Radiocarbon Age, B.P.	Calendric (calibrated) Radiocarbon Age, B.P.
	Regression Formula 1: Age = 46,660 (A/I)-473	Regression Formula 2: Age = 36,210 (A/I)-385*
CD-712	7,694	5,952
CD-713	7,227	5,590

NOTE: Regression formulas are from Abbott et al. (1996:621)  
 \*Regression Formula 2 is applicable only for specimens less than 5,000 years old.

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## **APPENDIX B: Geologic Profile Descriptions**

Karl W. Kibler

Profile descriptions were prepared for select backhoe trenches and test units. Each profile description is based on a 50–100-cm-wide exposure within the trench or unit wall. Profile descriptions use the neutral term “zone” to describe pedogenic and stratigraphic variation within the profile under a single term. Each zone is numbered sequentially from the top (surface) down. For each zone the depth, thickness, color, consistence, texture, soil structure, mottles and inclusions, and the nature of the lower boundary were described according to the procedures and criteria presented by Buol et al. (1980:21–43), Birkeland (1984), and the Soil Survey Staff (1996).

The color (Munsell Soil Color Chart) and consistence (loose, very friable, friable, firm, very firm, and extremely firm) of a zone or sediment were recorded from a moist condition. For the majority of the profiles, textural classifications are based on field estimates (see Olson 1976:19) of the relative proportions of particle sizes less than 2.0 mm in diameter (i.e., sand, silt, and clay). Twelve textural classes, based on the USDA textural classification of soils (Soil Survey Staff 1996:631) are used: sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The textural name is prefaced by the term *gravelly* if 20 to 50 percent of the sediment by volume is of gravel size (2–76 mm) or *very gravelly* if 50 to 90 percent of the sediment is of gravel size. The same proportions apply if coarser materials such as cobbles (76–256 mm) and boulders (>256 mm) are present (Soil Survey Staff 1975). In some instances textural classes based on the percentages of gravels and the ratio of sand to mud (silt and clay) (see Folk 1954, 1974)

were more appropriate to describe the textural properties of zones. This classification scheme has 15 textural classes: gravel, muddy gravel, muddy sandy gravel, sandy gravel, gravelly mud, gravelly muddy sand, gravelly sand, slightly gravelly mud, slightly gravelly sandy mud, slightly gravelly muddy sand, slightly gravelly sand, mud, sandy mud, muddy sand, and sand.

Soil structure characteristics include grade, size, and type. The grade is shown as weak, moderate, or strong. The size of the peds is shown as fine, medium, or coarse, depending on ped morphology or type. The type, referring to the shape of the peds, is identified as blocky (subangular and angular), platy, prismatic, columnar, or granular. Soil structures, if present or preserved, were also noted. Types of sedimentary structures include, but are not limited to: planar laminations; graded beds; low-, intermediate-, and high-angle cross-stratifications; trough cross-stratifications; ripple stratifications; and massive structures.

Mottles are described by color, abundance, contrast, and size. Abundance is shown as few (<2 percent), common (2–20 percent), and many (>20 percent), while contrast is described as faint, distinct, or prominent. Size ranges are given as fine (<0.5 cm), medium (0.5–1.5 cm), or coarse (>1.5 cm). The lower boundary of each zone is described in terms of distinctiveness—very abrupt (<0.1 cm), abrupt (0.1–2.5 cm), clear (2.5–6.4 cm), gradual (6.4–12.7 cm), and diffused (>12.7 cm)—and topography—smooth, wavy, irregular, and broken. Final soil horizon designations were made based on the guidelines and criteria of Birkeland (1984) and the Soil Survey Staff (1996).

Zone	Depth (cm)	Description
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#### 41BL340

##### Backhoe Trench 1, north wall

1	0–3 cm	Brown (10YR 5/3) very firm clay loam, massive, many roots and rootlets, common organic materials, abrupt smooth lower boundary. December 1991 flood deposit, C horizon.
2	3–23 cm	Dark gray (10YR 4/1) firm gravelly clay loam, moderate medium angular blocky structure, many roots and rootlets, few voids, few fecal pellets, clear smooth lower boundary. Late Holocene upper West Range alluvium, 2Ab horizon.

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<b>Zone</b>	<b>Depth (cm)</b>	<b>Description</b>
3	23–54 cm	Grayish brown (10YR 5/2) firm gravelly clay loam, moderate medium angular blocky structure, common rootlets, few snail shells, common voids, common fecal pellets, clear smooth lower boundary. Late Holocene upper West Range alluvium, 2ABb horizon.
4	54–158 cm	Brown (10YR 5/3) very firm gravelly clay, moderate medium angular blocky structure, few rootlets, few snail shells, common CaCO <sub>3</sub> filaments, clear smooth lower boundary. Late Holocene upper West Range alluvium, 2Bwkb horizon.
5	158–193 cm	Light yellowish brown (10YR 6/4) very firm very gravelly clay, strong medium angular blocky structure, few CaCO <sub>3</sub> filaments, few rootlets, few voids, few fecal pellets, abrupt smooth lower boundary. Late Holocene upper West Range alluvium, 2C horizon.
6	193–253 cm	Yellowish brown (10YR 5/4) firm silty clay loam, moderate medium angular blocky structure, few small dispersed gravels, few rootlets, few snail shells, few traces of leached carbonates, gradual smooth lower boundary. Late Holocene upper West Range alluvium, 2C2 horizon.
7	253–303+ cm	Yellowish brown (10YR 5/4) very firm clay loam, moderate coarse angular blocky structure, few rootlets, few traces of leached carbonates, lower boundary not observed. Late Holocene upper West Range alluvium, 2C3 horizon.

Backhoe Trench 2, north wall

1	0–4 cm	Grayish brown (10YR 5/2) firm clay loam, massive, many roots and rootlets, common voids, common fecal pellets, clear smooth lower boundary. December 1991 flood deposit, C horizon.
2	4–22 cm	Very dark gray (10YR 3/1) firm clay loam, moderate coarse angular blocky structure, many roots and rootlets, few snail shells, common fecal pellets, common voids, gradual smooth lower boundary. Late Holocene upper West Range alluvium, 2Ab horizon.
3	22–92 cm	Grayish brown (10YR 5/2) firm clay loam, weak coarse prismatic structure breaking to moderate medium angular blocky structure, common rootlets, common voids, common fecal pellets, few dispersed small gravels, common CaCO <sub>3</sub> filaments in lower half of zone, clear smooth lower boundary. Late Holocene upper West Range alluvium, 2ABb horizon.
4	92–126 cm	Brown (10YR 5/3) very firm gravelly clay, strong medium angular blocky structure, common CaCO <sub>3</sub> filaments, few rootlets, few snail shells, abrupt smooth to wavy lower boundary. Late Holocene upper West Range alluvium, 2Bwkb horizon.
5	126–144 cm	Yellowish brown (10YR 5/4) very firm very gravelly clay, structureless, common thin CaCO <sub>3</sub> coatings on clasts, abrupt smooth to wavy lower boundary. Late Holocene upper West Range alluvium, 2Ck horizon.
6	144–180+ cm	Light yellowish brown (10YR 6/4) very firm clay, moderate medium

Zone	Depth (cm)	Description
		angular blocky structure, common traces of leached carbonates, lower boundary not observed. Late Holocene upper West Range alluvium, 2C horizon.

#### Site 41CV578

##### Backhoe Trench 2, north wall

1	0–26 cm	Grayish brown (10YR 5/2) firm silty clay loam, moderate medium angular blocky structure, many roots and rootlets, common voids, common fecal pellets, few snail shells, clear smooth lower boundary. Late Holocene upper West Range alluvium, A horizon.
2	26–186 cm	Yellowish brown (10YR 5/4) firm clay loam, weak coarse prismatic structure breaking to moderate medium angular blocky structure, common CaCO <sub>3</sub> filaments, few snail shells, few rootlets, common voids, common fecal pellets, two pieces of culturally burned rock at 76 cm, clear smooth lower boundary. Early to middle Holocene Fort Hood/late Holocene upper West Range alluvium, Bwk horizon.
3	186–266 cm	Light yellowish brown (10YR 6/4) firm sandy clay loam, moderate coarse prismatic breaking to strong coarse angular blocky structure, many faint medium mottles (10YR 5/4), many fine voids, common traces of leached carbonates, culturally burned rocks and charcoal at 266 cm, clear smooth lower boundary. Early to middle Holocene Fort Hood alluvium, Bwk2 horizon.
4	266–292+ cm	Yellow (10YR 7/6) friable sandy loam, moderate medium angular blocky structure, few fine voids, few pedotubules, lower boundary not observed. Early to middle Holocene Fort Hood alluvium, C horizon.

##### Backhoe Trench 4, north wall

1	0–78 cm	Brown to dark brown (10YR 4/3) firm gravelly clay loam, moderate medium angular blocky structure, many roots and rootlets, common pieces of culturally burned rock, many snail shells, common CaCO <sub>3</sub> filaments, common voids, many fecal pellets, clear smooth lower boundary. Late Holocene colluvium, A horizon.
2	78–124 cm	Strong brown (7.5YR 4/6) firm gravelly clay loam, structureless, few rootlets, few snail shells, common CaCO <sub>3</sub> filaments, few fecal pellets, common pieces of culturally burned rock, gradual smooth lower boundary. Late Holocene colluvium, Bk horizon.
3	124–154+ cm	Reddish yellow (7.5YR 6/6) firm gravelly silty clay loam, structureless, few fecal pellets, few rootlets, lower boundary not observed. Late Holocene colluvium, C horizon.

##### Backhoe Trench 5, south wall

1	0–10 cm	Artificial fill.
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<b>Zone</b>	<b>Depth (cm)</b>	<b>Description</b>
2	10–30 cm	Dark gray (10YR 4/1) firm clay loam, moderate medium angular blocky structure, many roots and rootlets, many fine voids, common fecal pellets, few CaCO <sub>3</sub> filaments on ped faces, gradual smooth lower boundary. Late Holocene Ford alluvium, A horizon.
3	30–85 cm	Very dark gray (10YR 3/1) very firm clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, common roots and rootlets, common CaCO <sub>3</sub> filaments on ped faces, few voids, common fecal pellets, clear smooth lower boundary. Late Holocene Ford alluvium, ABk horizon.
4	85–194 cm	Dark grayish brown (10YR 4/2) firm gravelly silty clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, common roots and rootlets, common pieces of culturally burned rock, many CaCO <sub>3</sub> filaments, few fine voids, few pedotubules, gradual smooth lower boundary. Late Holocene upper West Range alluvium, 2Bwk horizon.
5	194–234 cm	Dark grayish brown (10YR 4/2) firm sandy clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, common fine voids, few snail shells, few roots and rootlets, many CaCO <sub>3</sub> filaments, clear smooth lower boundary. Late Holocene upper West Range alluvium, 2Bwk2 horizon.
6	234–265+ cm	Yellowish brown (10YR 5/4) friable sandy loam, moderate medium angular blocky structure, few snail shells, lower boundary not observed. Late Holocene upper West Range alluvium, 2C horizon.

**Site 41CV755**

Backhoe Trench 1, east wall

1	0–39 cm	Very dark grayish brown (10YR 3/2) firm gravelly clay loam, moderate medium subangular blocky structure, many roots and rootlets, many voids, many fecal pellets, few snail shells, clear smooth lower boundary. Holocene colluvium, A horizon.
2	39–94 cm	Dark yellowish brown (10YR 4/4) firm very gravelly clay loam, weak medium subangular blocky structure, common roots and rootlets, common CaCO <sub>3</sub> filaments, common voids, common fecal pellets, few snail shells, gradual smooth lower boundary. Holocene colluvium, Bwk horizon.
3	94–168 cm	Brown (7.5YR 5/4) firm very gravelly clay loam, moderate medium subangular blocky structure, few rootlets, many CaCO <sub>3</sub> filaments, abrupt smooth lower boundary. Late Pleistocene Jackson alluvium, 2Bbk horizon.
4	168–194+ cm	Light brown (7.5YR 6/4) firm very cobbly clay loam, structureless, few rootlets, thin CaCO <sub>3</sub> coatings on clasts, lower boundary not observed. Late Pleistocene Jackson alluvium, 2Ck horizon.

Zone	Depth (cm)	Description
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Backhoe Trench 2, west wall

1	0–35 cm	Dark grayish brown (10YR 4/2) firm clay loam, moderate medium subangular blocky structure, many roots and rootlets, few small matrix-supported gravels, many voids, many fecal pellets, abrupt smooth (dipping north) lower boundary. Holocene colluvium, A horizon.
2	35–65 cm	Brown (10YR 5/3) firm gravelly clay loam, moderate medium subangular blocky structure, common roots and rootlets, common voids, common fecal pellets, clear smooth (dipping north) lower boundary. Holocene colluvium, Bw horizon.
3	65–122 cm	Light yellowish brown (10YR 6/4) firm gravelly clay loam, weak medium subangular blocky structure, many CaCO <sub>3</sub> filaments, few rootlets, clear smooth (dipping north) lower boundary. Holocene colluvium, Ck horizon.
4	122–272+ cm	Lower Cretaceous Walnut Formation, R horizon.

**Site 41CV947**

Backhoe Trench 1, south wall

1	0–30 cm	Very dark grayish brown (10YR 3/2) friable loamy fine sand, moderate medium angular blocky structure, common distinct medium mottles (10YR 5/3), many roots and rootlets, few voids, common pedotubules, clear smooth lower boundary. Late Holocene colluvium, A horizon.
2	30–134 cm	Strong brown (7.5YR 4/6) firm sandy clay loam, moderate medium angular blocky structure, common faint coarse mottles (7.5YR 6/8) increasing in frequency with depth, common roots and rootlets, common fine voids, few pieces of charcoal, few pieces of culturally burned rock, clear smooth lower boundary. Late Holocene colluvium, C horizon.
3	134–149+ cm	Brown to dark brown (10YR 4/3) friable sandy loam, many rounded fragments of sandstone, lower boundary not observed. Late Holocene colluvium, 2Ab horizon.

**Site 41CV957**

Backhoe Trench 1, east wall (south end of trench)

1	0–35 cm	Very dark gray (10YR 3/1) firm very gravelly clay loam, moderate coarse angular blocky structure, many roots and rootlets, common pieces of culturally burned rock and chert debitage, common pedotubules, common organic materials, clear smooth lower boundary. Late Holocene lower West Range alluvium, A horizon.
2	35–47 cm	Very dark grayish brown (10YR 3/2) firm gravelly clay loam, moderate medium angular blocky structure, many roots and rootlets, many pieces

Zone	Depth (cm)	Description
		of culturally burned rock and chert debitage, common pedotubules, common fecal pellets, few snail shells, abrupt smooth lower boundary. Late Holocene lower West Range alluvium, Bw horizon.
3	47–63 cm	Brown (10YR 5/3) firm very gravelly clay, structureless, common roots and rootlets, common pedotubules, common fecal pellets, few snail shells, abrupt smooth lower boundary. Late Holocene lower West Range alluvium, 2Ab horizon.
4	63–110+ cm	Brown (10YR 5/3) firm clay loam, moderate medium angular blocky structure, many CaCO <sub>3</sub> filaments, common roots and rootlets, few dispersed gravels, few pedotubules, lower boundary not observed. Late Holocene lower West Range alluvium, 2Bwkb horizon.

Backhoe Trench 1, east wall (north end of trench)

1	0–48 cm	Dark gray (10YR 4/1) very firm clay, moderate medium angular blocky structure, many roots and rootlets, common pedotubules, common fecal pellets, common dispersed small gravels, few snail shells, clear smooth lower boundary. Late Holocene Ford alluvium, A horizon.
2	48–94 cm	Dark gray (10YR 4/1) firm gravelly clay loam, moderate coarse angular blocky structure, common roots and rootlets, common pieces of culturally burned rock and chert debitage, common sand-sized carbonate clasts, common pedotubules, common fecal pellets, clear smooth lower boundary. Late Holocene lower West Range alluvium, 2Ab horizon.
3	94–149 cm	Dark grayish brown (10YR 4/2) firm very gravelly clay loam, moderate medium angular blocky structure, common distinct medium mottles (10YR 5/4), many CaCO <sub>3</sub> filaments, few rootlets, few snail shells, few pedotubules, few fecal pellets, clear smooth lower boundary. Late Holocene lower West Range alluvium, 2Bwkb horizon.
4	149–162+ cm	Gray (10YR 5/1) firm very gravelly clay loam, weak to moderate medium angular blocky structure, many distinct coarse mottles (10YR 5/4), few rootlets, lower boundary not observed. Late Holocene lower West Range alluvium, 2C horizon.

**Site 41CV984**

Test Unit 1, east wall

1	0–5 cm	Very dark grayish brown (10YR 3/2) friable sandy loam, structureless, common roots and rootlets, few matrix-supported gravels, clear smooth lower boundary. Late Holocene colluvium, C horizon.
2	5–40 cm	Very dark gray (10YR 3/1) firm sandy loam, structureless, common roots and rootlets, many densely-packed pieces of culturally burned rock, abrupt smooth lower boundary. Late Holocene colluvial and anthropogenic deposit, 2Ab horizon.

Zone	Depth (cm)	Description
3	40–56+ cm	Yellowish red (5YR 4/6) firm sandy clay loam, strong medium angular blocky structure, common roots and rootlets, few voids, common pedotubules, lower boundary not observed. Late Pleistocene/Holocene colluvium, 3Btb horizon.

Test Unit 2, south wall

1	0–10 cm	Very dark grayish brown (10YR 3/2) friable sandy loam, weak fine subangular blocky structure, common roots and rootlets, common organic materials, common fine voids, clear smooth lower boundary. Late Holocene colluvium, A horizon.
2	10–25 cm	Reddish brown (5YR 5/4) firm sandy clay loam, strong medium angular blocky structure, few fine voids, common rootlets, common pedotubules, few fecal pellets, abrupt wavy lower boundary. Late Pleistocene/Holocene colluvium, 2Bt horizon.
3	25+ cm	Lower Cretaceous Glen Rose limestone, R horizon.

Test Unit 3, south wall

1	0–24 cm	Very dark grayish brown (10YR 3/2) friable sandy loam, weak fine angular blocky structure, few prominent coarse mottles (10YR 4/3), common roots and rootlets, common organic materials, few voids, few fecal pellets, clear smooth lower boundary. Late Holocene colluvium, A horizon.
2	24–48+ cm	Yellowish red (5YR 5/6) very firm sandy clay loam, strong medium angular blocky structure, common roots and rootlets, few manganese stains on ped faces, common pedotubules, few voids, lower boundary not observed. Late Pleistocene/Holocene colluvium, 2Bt horizon.

**Site 41CV988**

Test Unit 1, south wall

1	0–12 cm	Brown to dark brown (10YR 4/3) friable loamy fine sand, structureless, common roots and rootlets, few matrix-supported gravels, few voids, few pedotubules, burned rock feature, clear smooth lower boundary. Late Holocene colluvium, A horizon.
2	12–25+ cm	Red (2.5YR 4/6) firm sandy clay loam, strong medium angular blocky structure, few roots and rootlets, common manganese stains on ped faces, common pedotubules, lower boundary not observed. Late Pleistocene/Holocene colluvium, 2Bt horizon.

Test Unit 2, east wall

1	0–21 cm	Brown to dark brown (10YR 4/3) friable loamy fine sand, structureless, common distinct (10YR 5/4) to prominent (2.5YR 4/6) coarse mottles, many
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Zone	Depth (cm)	Description
		roots and rootlets, few voids, few pedotubules, abrupt smooth lower boundary. Late Holocene colluvium, Cu horizon.
2	21-33 cm	Dark grayish brown (10YR 4/2) friable fine sand, weak fine angular blocky structure, common distinct coarse mottles (10YR 5/4), few roots and rootlets, common pedotubules, few voids, few charcoal flecks, clear smooth lower boundary. Late Holocene colluvium, 2Ab horizon.
3	33-43+ cm	Yellowish red (5YR 4/6) firm sandy clay loam, strong medium angular blocky structure, common manganese stains on ped faces, few voids, common pedotubules, lower boundary not observed. Late Pleistocene/Holocene colluvium, 3Btb horizon.

Test Unit 3, north wall

1	0-28 cm	Dark grayish brown (10YR 4/2) friable loamy fine sand, weak fine subangular blocky structure, many roots and rootlets, common organic materials, few fine voids, clear smooth lower boundary. Late Holocene colluvium, A horizon.
2	28-53 cm	Brown to dark brown (10YR 4/3) friable sandy loam, weak fine subangular blocky structure, common roots and rootlets, few fine voids, few pedotubules, few matrix-supported sandstone fragments, abrupt wavy to broken lower boundary. Late Holocene colluvium, E horizon.
3	53+ cm	Lower Cretaceous Paluxy sandstone, R horizon.

Test Unit 7, south wall

1	0-9 cm	Very dark grayish brown (10YR 3/2) friable loamy fine sand, structureless, many roots and rootlets, common organic materials, few fine voids, abrupt smooth lower boundary. Late Holocene colluvium, A1 horizon.
2	9-37 cm	Dark grayish brown (10YR 4/2) friable loamy fine sand, weak fine angular blocky structure, few faint coarse mottles (10YR 4/3), many roots and rootlets, common fine voids, few fecal pellets, abrupt smooth lower boundary. Late Holocene colluvium, A2 horizon.
3	37-49+ cm	Reddish brown (5YR 4/4) firm clay loam, strong medium angular blocky structure, lower boundary not observed. Late Pleistocene/Holocene colluvium, 2Bt horizon.

**Site 41CV1012**

Test Unit 2, south wall

1	0-24 cm	Dark brown (7.5YR 3/2) very firm clay loam, strong coarse angular blocky structure, many roots and rootlets, few dispersed gravels, common fecal pellets, common pedotubules, few voids, gradual smooth lower boundary. Late Holocene West Range alluvium, A horizon.
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Zone	Depth (cm)	Description
2	24–60 cm	Dark brown (7.5YR 3/4) very firm clay loam, strong coarse prismatic breaking to strong medium angular blocky structure, common roots and rootlets, common dispersed gravels, abrupt smooth lower boundary. Late Holocene West Range alluvium, Bw horizon.
3	60+ cm	Dark brown (7.5YR 3/4) very firm very gravelly clay loam, lower boundary not observed. Late Holocene West Range alluvium, Bw2 horizon.

#### Site 41CV1030

##### Backhoe Trench 4, west wall

1	0–53 cm	Dark brown (10YR 3/3) friable silty clay loam, moderate coarse angular blocky structure, many roots and rootlets, common snail shells, common voids, common fecal pellets, few CaCO <sub>3</sub> filaments, gradual smooth lower boundary. Late Holocene upper West Range alluvium, A horizon.
2	53–181 cm	Yellowish brown (10YR 5/4) friable clay loam, weak coarse prismatic breaking to moderate coarse angular blocky structure, many CaCO <sub>3</sub> filaments, many voids, many fecal pellets, common snail shells, common rootlets, clear smooth lower boundary. Late Holocene upper West Range alluvium, Bwk horizon.
3	181–339 cm	Yellowish brown (10YR 5/4) firm clay loam, weak coarse prismatic breaking to moderate coarse angular blocky structure, common voids, common fecal pellets, few snail shells, few traces of leached carbonates, clear smooth lower boundary. Late Holocene upper West Range alluvium, Bw horizon.
4	339–386+ cm	Yellowish brown (10YR 5/4) firm clay loam, moderate medium angular blocky structure, few traces of leached carbonates, lower boundary not observed. Late Holocene upper West Range alluvium, C horizon.

##### Backhoe Trench 6, north wall

1	0–48 cm	Very dark grayish brown (10YR 3/2) firm silty clay loam, moderate coarse angular blocky structure, many roots and rootlets, common snail shells, common voids, common fecal pellets, few CaCO <sub>3</sub> filaments, gradual smooth lower boundary. Late Holocene upper West Range alluvium, A horizon.
2	48–98 cm	Brown (10YR 5/3) firm silty clay loam, weak coarse prismatic breaking to moderate coarse angular blocky structure, common roots and rootlets, common snail shells, many CaCO <sub>3</sub> filaments, common voids, common fecal pellets, gradual smooth lower boundary. Late Holocene upper West Range alluvium, Bwk horizon.
3	98–162 cm	Yellowish brown (10YR 5/4) firm clay loam, weak coarse prismatic breaking to moderate coarse angular blocky structure, few roots and rootlets, many CaCO <sub>3</sub> filaments, few snail shells, few voids, few fecal pellets, diffuse smooth lower boundary. Late Holocene upper West Range alluvium, Bwk2 horizon.

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<b>Zone</b>	<b>Depth (cm)</b>	<b>Description</b>
4	162–270 cm	Light yellowish brown (10YR 6/4) firm silty clay loam, moderate coarse angular blocky structure, few roots and rootlets, few voids, few fecal pellets, common snail shells, few CaCO <sub>3</sub> filaments, diffuse smooth lower boundary. Late Holocene upper West Range alluvium, C horizon.
5	270–330+ cm	Yellowish brown (10YR 5/4) firm clay loam, moderate medium angular blocky structure, few voids, few traces of leached carbonates, lower boundary not observed. Late Holocene upper West Range alluvium, C2 horizon.

Backhoe Trench 9, south wall

1	0–70 cm	Dark grayish brown (10YR 4/2) friable loam, moderate coarse angular blocky structure, common roots and rootlets, gradual smooth lower boundary. Late Holocene upper West Range alluvium, A horizon.
2	70–259 cm	Light yellowish brown (10YR 6/4) friable clay loam, strong coarse angular blocky structure, many CaCO <sub>3</sub> filaments, common roots and rootlets, common snail shells, freshwater mussel shell at 187 cm, common voids, common fecal pellets, gradual smooth lower boundary. Late Holocene upper West Range alluvium, Bwk horizon.
3	259–324+ cm	Light yellowish brown (10YR 6/4) firm clay loam, strong coarse angular blocky structure, few rootlets, common voids, common fecal pellets, common snail shells, common traces of leached carbonates, lower boundary not observed. Late Holocene upper West Range alluvium, C horizon.

Backhoe Trench 10, west wall

1	0–33 cm	Dark grayish brown (10YR 4/2) friable silty clay loam, moderate medium to coarse angular blocky structure, many roots and rootlets, common voids, common fecal pellets, common medium sandy mottles, gradual smooth lower boundary. Late Holocene Ford alluvium, A1 horizon.
2	33–76 cm	Very dark grayish brown (10YR 3/2) friable clay loam, moderate coarse angular blocky structure, common medium sandy mottles, common roots and rootlets, common pieces of charcoal, common voids, common fecal pellets, abrupt smooth lower boundary. Late Holocene Ford alluvium, A2 horizon.
3	76–99 cm	Intercalated thick laminae of very dark grayish brown (10YR 3/2) very fine sand and very dark grayish brown (10YR 3/2) mud, very friable, few snail shells, common roots and rootlets, common charcoal flecks, common voids, common fecal pellets, gradual smooth lower boundary. Late Holocene Ford alluvium, C horizon.
4	99–110 cm	Very dark grayish brown (10YR 3/2) friable clay loam, moderate very coarse granular structure, common roots and rootlets, common voids, common fecal pellets, few pieces of charcoal, few snail shells, abrupt smooth lower boundary. Late Holocene Ford alluvium, C2 horizon.
5	110–119 cm	Dark gray (10YR 4/1) friable sandy clay loam, moderate very coarse

Zone	Depth (cm)	Description
		granular structure, common roots and rootlets, common voids, common fecal pellets, well preserved thick laminae of very fine sand, abrupt smooth lower boundary. Late Holocene Ford alluvium, 2AC horizon.
6	119–213 cm	Grayish brown (10YR 5/2) firm clay loam, strong medium subangular blocky structure, common roots and rootlets, common organic materials, few CaCO <sub>3</sub> filaments, common voids, common fecal pellets, few snail shells, few pieces of charcoal, clear smooth lower boundary. Late Holocene Ford alluvium, 3Ab horizon.
7	213–273+ cm	Brown (10YR 5/3) friable sandy loam, moderate medium angular blocky structure, common distinct medium mottles (10YR 4/2), few krotovina, common roots and rootlets, few snail shells, lower boundary not observed. Late Holocene Ford alluvium, 3Bwb horizon.

Backhoe Trench 11, east wall

1	0–22 cm	Yellowish brown (10YR 5/4) friable sandy loam, structureless, common roots and rootlets, few pedotubules, very abrupt smooth lower boundary. Late Holocene Ford alluvium (1991 flood?), Cu horizon.
2	22–112 cm	Dark gray (10YR 4/1) firm silty clay loam, moderate very fine angular blocky structure, common fecal pellets, common voids, common roots and rootlets, few pieces of charcoal, few very thin sand beds, clear smooth lower boundary. Late Holocene Ford alluvium, 2Ab horizon.
3	112–195 cm	Intercalated dark grayish brown (10YR 4/2) silty clay loam and brown (10YR 5/3) silt, firm, moderate medium angular blocky structure, many voids, few roots and rootlets, common fecal pellets, few flecks of charcoal, few CaCO <sub>3</sub> filaments, few poorly preserved thin sand beds, gradual smooth lower boundary. Late Holocene Ford alluvium, 2C horizon.
4	195–276+ cm	Very dark grayish brown (10YR 3/2) firm silty clay loam, moderate medium angular blocky structure, few roots and rootlets, common voids, few CaCO <sub>3</sub> filaments, common fecal pellets, moderately preserved laminae of silt and clay, lower boundary not observed. Late Holocene Ford alluvium, 3Ab horizon.

Backhoe Trench 13, north wall

1	0–37 cm	Brown (10YR 5/3) friable laminated medium sand, many roots and rootlets, common voids, few fecal pellets, abrupt smooth lower boundary. Late Holocene Ford alluvium (1991 flood?), Cu horizon.
2	37–167 cm	Dark grayish brown (10YR 4/2) firm clay loam, moderate medium angular blocky structure, common roots and rootlets, many voids, common fecal pellets, common sand-sized carbonate clasts, few CaCO <sub>3</sub> filaments, thin beds of sand and silt at 74, 90, 101, and 134 cm, thin sand bed at 137 cm, abrupt smooth lower boundary. Late Holocene Ford alluvium, AC horizon.
3	167–215 cm	Very dark grayish brown (10YR 3/2) firm clay loam, moderate coarse

Zone	Depth (cm)	Description
		angular blocky structure, few roots and rootlets, few CaCO <sub>3</sub> filaments in lower half of zone, many voids, many pedotubules, common fecal pellets, few pieces of charcoal, thin laminated sand bed at 215 cm, thin bed of fine sand and silt at 187 cm, abrupt smooth lower boundary. Late Holocene Ford alluvium, 2Ab horizon.
4	215–309 cm	Very dark grayish brown (10YR 3/2) firm clay loam, moderate medium angular blocky structure, few roots and rootlets, few CaCO <sub>3</sub> filaments in lower half of zone, many sand-sized carbonate clasts, few voids, thin sand beds at 250, 262, and 287 cm, clear smooth lower boundary. Late Holocene Ford alluvium, 2Bwb horizon.
5	309–386+ cm	Brown (10YR 5/3) firm sandy clay loam, moderate medium angular blocky structure, few roots and rootlets, few voids, well-preserved laminae of mud, lower boundary not observed. Late Holocene Ford alluvium, 2C horizon.

**Site 41CV1043**

Test Unit 1, south wall

1	0–26 cm	Dark grayish brown (10YR 4/2) friable fine sand, weak to moderate medium angular blocky structure, many roots and rootlets, common voids, few pedotubules, abrupt smooth lower boundary. Late Holocene colluvium, A horizon.
2	26–48+ cm	Yellowish red (5YR 5/8) very firm sandy clay loam, strong coarse angular blocky structure, common voids, common roots and rootlets, common pedotubules, few manganese stains on ped faces, lower boundary not observed. Late Pleistocene/Holocene colluvium, 2Bt horizon.

Test Unit 2, south wall

1	0–27 cm	Very dark grayish brown (10YR 3/2) friable fine sand, moderate medium angular blocky structure, many roots and rootlets, common voids, few organic materials, abrupt smooth lower boundary. Late Holocene colluvium, A horizon.
2	27+ cm	Strong brown (7.5YR 5/6) very firm sandy clay loam, lower boundary not observed. Late Pleistocene/Holocene colluvium, 2Bt horizon.

Test Unit 3, south wall

1	0–16 cm	Very dark gray (10YR 3/1) firm loamy fine sand, moderate medium angular blocky structure, many roots and rootlets, common organic materials, few matrix-supported gravels, common fecal pellets, abrupt smooth lower boundary. Late Holocene colluvium, A horizon.
2	16–39 cm	Dark grayish brown (10YR 4/2) friable loamy fine sand, moderate medium angular blocky structure, common roots and rootlets, common voids, few matrix-supported gravels, few pedotubules, clear smooth lower boundary.

Zone	Depth (cm)	Description
		Late Holocene colluvium, Bw horizon.
3	39–67+ cm	Yellowish brown (10YR 5/6) friable fine sand, structureless, common rounded fragments of sandstone (10–50 mm), lower boundary not observed. Late Pleistocene/Holocene colluvium, 2C horizon.

**Site 41CV1048**

Backhoe Trench 1, north wall

1	0–42 cm	Black (2.5Y 2/0) very firm clay loam, moderate coarse granular structure, many roots and rootlets, common fecal pellets, many voids, common small matrix-supported gravels, densely-packed culturally burned rocks throughout the zone, clear wavy lower boundary. Late Holocene colluvium, A horizon.
2	42–81 cm	Brown to dark brown (10YR 4/3) very firm gravelly clay loam, moderate medium angular blocky structure, common voids, many pedotubules, common fecal pellets, common roots and rootlets, clear smooth lower boundary. Late Holocene colluvium, Bw horizon.
3	81–130 cm	Light olive brown (2.5Y 5/3) very firm clay loam, moderate very coarse granular structure, common roots and rootlets, few dispersed gravels, common voids, abrupt smooth lower boundary. Early to middle Holocene Fort Hood alluvium, 2Ck horizon.
4	130–145+ cm	Rounded, clast-supported gravels, lower boundary not observed. Early to middle Holocene Fort Hood alluvium, 2C horizon.

Backhoe Trench 2, north wall

1	0–33 cm	Very dark gray (10YR 3/1) very firm clay loam, moderate coarse granular structure, many roots and rootlets, common voids, common fecal pellets, few dispersed small gravels, clear smooth lower boundary. Late Holocene West Range alluvium, A1 horizon.
2	33–55 cm	Very dark gray (2.5Y 3/0) very firm clay loam, moderate coarse granular structure, common dispersed gravels, common roots and rootlets, common voids, common fecal pellets, few fine CaCO <sub>3</sub> filaments, clear smooth lower boundary. Late Holocene West Range alluvium, A2 horizon.
3	55–82 cm	Dark grayish brown (10YR 4/2) firm gravelly clay loam, moderate medium angular blocky structure, common roots and rootlets, few voids, common CaCO <sub>3</sub> filaments, clear smooth lower boundary. Late Holocene West Range alluvium, Bwk horizon.
4	82–178 cm	Dark gray (2.5Y 4/0) very firm gravelly clay, weak medium angular blocky structure, few roots and rootlets, common voids, few CaCO <sub>3</sub> filaments, abrupt wavy lower boundary. Early to middle Holocene Fort Hood alluvium, C horizon.

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Zone	Depth (cm)	Description
5	178+ cm	Rounded, clast-supported gravels, lower boundary not observed. Early to middle Holocene Fort Hood alluvium, C2 horizon.

**Site 41CV1049**

Backhoe Trench 1, east wall

1	0–21 cm	Very dark gray (10YR 3/1) friable to firm loamy fine sand, moderate medium angular blocky structure, common distinct medium mottles (10YR 5/3 and 5YR 4/6), common roots and rootlets, common pedotubules, few fecal pellets, abrupt smooth to wavy lower boundary. Late Holocene colluvium, A horizon.
2	21–61 cm	Red (2.5YR 4/6) to yellowish red (5YR 4/6) very firm clay loam to sandy clay loam, moderate coarse prismatic breaking to strong coarse angular blocky structure, common roots and rootlets, few voids, common pedotubules, common manganese stains on ped faces, very abrupt to abrupt wavy lower boundary. Late Pleistocene/Holocene colluvium, 2Bt horizon.
3	61–86+ cm	Pale yellow (2.5Y 8/4) and brownish yellow (10YR 6/6) caliche laminae with thin yellowish red (5YR 4/6) clay beds, lower boundary not observed. Late Pleistocene caliche, 2K horizon.

Backhoe Trench 2, west wall

1	0–22 cm	Dark grayish brown (10YR 4/2) friable loamy fine sand, moderate medium angular blocky structure, many distinct medium mottles (10YR 5/6), many roots and rootlets, common pedotubules, abrupt smooth to wavy lower boundary. Late Holocene colluvium, A horizon.
2	22–72 cm	Yellowish brown (10YR 5/6) firm sandy clay loam, moderate coarse prismatic breaking to strong coarse angular blocky structure, many prominent coarse mottles (10YR 7/4 and 2.5Y 8/4), common roots and rootlets, few fecal pellets, many pedotubules, few voids, common rounded sandstone fragments in lower half of zone, abrupt smooth lower boundary. Late Pleistocene/Holocene colluvium, 2Bt horizon.
3	72–161+ cm	White (10YR 8/1) fine-grained quartz sandstone, common thick laminae of caliche, lower boundary not observed. Lower Cretaceous Paluxy Sandstone, 3R horizon.

**Site 41CV1050**

Backhoe Trench 1, south wall

1	0–22 cm	Dark grayish brown (10YR 4/2) friable loamy sand, moderate coarse angular blocky structure, common distinct medium mottles (10YR 6/3), many roots and rootlets, common voids, few pedotubules, very abrupt
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Zone	Depth (cm)	Description
		smooth to wavy lower boundary. Late Holocene colluvium, A horizon.
2	22–68 cm	Reddish brown (5YR 4/4) grading to yellowish red (5YR 5/8) very firm sandy clay loam, strong coarse angular blocky structure, common prominent coarse mottles (10YR 7/6) in lower half of zone, common voids, common roots and rootlets, common manganese stains on ped faces, many pedotubules, abrupt smooth lower boundary. Late Pleistocene/Holocene colluvium, 2Bt-2BC horizon.
3	68–86+ cm	White (10YR 8/1) caliche, lower boundary not observed. Late Pleistocene caliche, 2K horizon.

Backhoe Trench 2, south wall

1	0–13 cm	Very dark grayish brown (10YR 3/2) firm fine sandy loam, moderate coarse angular blocky structure, common faint fine mottles (10YR 5/4 and 7.5YR 4/4), many roots and rootlets, few voids, common pedotubules, very abrupt smooth lower boundary. Late Holocene colluvium, A horizon.
2	13–30 cm	Reddish brown (5YR 4/4) and brown to dark brown (7.5YR 4/4) very firm fine sandy clay loam, strong coarse angular blocky structure, few roots and rootlets, few voids, common fecal pellets, few pedotubules, few manganese stains on ped faces, abrupt wavy lower boundary. Late Pleistocene/Holocene colluvium, 2Bt-2BC horizon.
3	30–42 cm	Brown to dark brown (7.5YR 4/3) firm clay loam, moderate coarse angular blocky structure, common voids, few roots and rootlets, common fecal pellets, common pedotubules, many pieces of broken caliche, abrupt smooth lower boundary. Late Pleistocene colluvium, 3BC horizon.
4	42–51+ cm	White (10YR 8/1) caliche, lower boundary not observed. Late Pleistocene caliche, 3K horizon.

**Site 41CV1092**

Test Unit 1, east wall

1	0–11 cm	Black (2.5Y 2/0) very firm gravelly clay loam, moderate medium angular blocky structure, many roots and rootlets, common voids, common organic materials, abrupt wavy lower boundary. Late Holocene colluvium, A horizon.
2	11–30 cm	Very dark gray (10YR 3/1) firm very gravelly clay loam, weak medium angular blocky structure, common roots and rootlets, few voids, abrupt wavy to broken lower boundary. Late Holocene colluvium, Bw horizon.
3	30+ cm	Lower Cretaceous Walnut Formation, R horizon.

Test Unit 2, north wall

1	0–41 cm	Black (2.5Y 2/0) very firm gravelly clay loam, moderate medium angular
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Zone	Depth (cm)	Description
		blocky structure, many roots and rootlets, common voids, few fecal pellets, common organic materials, clear wavy lower boundary. Late Holocene colluvium, A horizon.
2	41-66+ cm	Dark grayish brown (10YR 4/2) very firm gravelly clay loam, moderate medium angular blocky structure, common voids, common CaCO <sub>3</sub> coatings on clasts, common roots and rootlets, lower boundary not observed. Late Holocene colluvium, Bwk horizon.

**Site 41CV1093**

Backhoe Trench 1, west wall

1	0-32 cm	Dark brown (10YR 3/3) friable loamy fine sand, moderate medium angular blocky structure, common roots and rootlets, common voids, few fecal pellets, clear smooth lower boundary. Late Holocene colluvium, A horizon.
2	32-61 cm	Dark reddish brown (2.5YR 3/4) very firm clay loam, moderate to strong coarse angular blocky structure, common roots and rootlets, few manganese stains on ped faces, few voids, common pedotubules, abrupt smooth lower boundary. Late Pleistocene/Holocene colluvium, 2Bt horizon.
3	61+ cm	Lower Cretaceous Glen Rose limestone, R horizon.

**Site 41CV1106**

Test Unit 1, west wall

1	0-24 cm	Very dark gray (7.5YR 3/0) firm sandy clay loam, moderate coarse angular blocky structure, common roots and rootlets, few voids, common matrix-supported gravels, common pieces of culturally burned rock, gradual smooth lower boundary. Late Holocene colluvium, A horizon.
2	24-40+ cm	Brown to dark brown (10YR 4/3) firm sandy clay, moderate coarse angular blocky structure, few voids, common rootlets, few fecal pellets, common pedotubules, few CaCO <sub>3</sub> filaments encrusted in the peds, many rounded sandstone gravels, lower boundary not observed. Late Holocene colluvium, Bw horizon.

Test Unit 3, east wall

1	0-10 cm	Brown to dark brown (10YR 4/3) friable loamy fine sand, weak medium angular blocky structure, many roots and rootlets, common fine voids, abrupt smooth lower boundary. Late Holocene colluvium, A horizon.
2	10-19 cm	Dark grayish brown (10YR 4/2) friable fine sand, structureless, common roots and rootlets, few voids, few pieces of culturally burned rock, clear smooth lower boundary. Late Holocene colluvium, 2Ab horizon.

*Appendix B: Geologic Profile Descriptions*

Zone	Depth (cm)	Description
3	19–54 cm	Brown (10YR 5/3) friable loamy fine sand, weak fine angular blocky structure, common roots and rootlets, common pedotubules, few pieces of culturally burned rock, few voids, abrupt smooth lower boundary. Late Holocene colluvium, 2Eb horizon.
4	54–84 cm	Dark grayish brown (10YR 4/2) friable fine sand, moderate medium angular blocky structure, common roots and rootlets, few pieces of culturally burned rock, few voids, abrupt wavy lower boundary. Late Holocene colluvium, 3Ab horizon.
5	84+ cm	Lower Cretaceous Paluxy sandstone, R horizon.

Test Unit 5, west wall

1	0–31 cm	Dark grayish brown (10YR 4/2) friable fine sandy loam, weak medium subangular blocky structure, common roots and rootlets, few voids, few charcoal flecks, diffuse smooth lower boundary. Late Holocene colluvium, A horizon.
2	31–52 cm	Brown (7.5YR 5/4) firm sandy clay, strong coarse subangular blocky structure, few roots and rootlets, common fine voids, few pedotubules, abrupt smooth lower boundary. Late Pleistocene/Holocene colluvium, 2Bt horizon.
3	52–70+ cm	Yellowish brown (10YR 5/4) very firm sandy clay, strong medium subangular blocky structure, common distinct coarse mottles (5Y 6/3), common rounded sandstone gravels, lower boundary not observed. Late Pleistocene/Holocene colluvium, 2BC horizon.

Test Unit 6, east wall

1	0–9 cm	Very dark gray (10YR 3/1) friable fine sandy loam, moderate coarse angular blocky structure, many roots and rootlets, few fine voids, common pedotubules, very abrupt smooth lower boundary. Late Holocene colluvium, A horizon.
2	9–20+ cm	Reddish yellow (7.5YR 6/6) to strong brown (7.5YR 5/6) firm sandy clay loam, strong coarse angular blocky structure, common rootlets, few matrix-supported gravels, few fine voids, few pedotubules, lower boundary not observed. Late Pleistocene/Holocene colluvium, 2Bt horizon.

**Site 41CV1120**

Backhoe Trench 1, north wall

1	0–40 cm	Dark grayish brown (10YR 4/2) firm silty clay loam, moderate medium angular blocky structure, many roots and rootlets, many snail shells, common voids, common fecal pellets, few pieces of culturally burned rock, clear smooth lower boundary. Late Holocene West Range alluvium, A horizon.
2	40–95 cm	Brown to dark brown (10YR 4/3) firm clay loam, weak coarse prismatic

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Zone	Depth (cm)	Description
		breaking to moderate coarse angular blocky structure, common roots and rootlets, common snail shells, common voids, common fecal pellets, many CaCO <sub>3</sub> filaments, gradual smooth lower boundary. Late Holocene West Range alluvium, Bwk horizon.
3	95–140 cm	Brown (10YR 5/3) firm clay loam, weak coarse prismatic breaking to moderate coarse angular blocky structure, common roots and rootlets, common CaCO <sub>3</sub> filaments, common voids, common fecal pellets, few snail shells, gradual smooth lower boundary. Late Holocene West Range alluvium, Bwk2 horizon.
4	140–192 cm	Yellowish brown (10YR 5/4) firm sandy clay loam, moderate coarse angular blocky structure, common rootlets, few snail shells, common voids, common fecal pellets, abrupt smooth lower boundary. Late Holocene West Range alluvium, C horizon.
5	192–222 cm	Brown (10YR 5/3) firm clay loam, moderate coarse prismatic structure, few roots and rootlets, few snail shells, common voids, common fecal pellets, clear smooth lower boundary. Early to middle Holocene Fort Hood alluvium, 2ABb horizon.
6	222–327+ cm	Brown (10YR 5/3) firm clay loam, moderate coarse prismatic structure, few rootlets, few voids, few fecal pellets, few CaCO <sub>3</sub> filaments, lower boundary not observed. Early to middle Holocene Fort Hood alluvium, 2Bwb horizon.

Backhoe Trench 3, west wall

1	0–39 cm	Brown to dark brown (10YR 4/3) friable silty clay loam, moderate coarse angular blocky structure, many roots and rootlets, common snail shells, many voids, many fecal pellets, clear smooth lower boundary. Early to middle Holocene Fort Hood alluvium, B/A horizon.
2	39–312+ cm	Yellowish brown (10YR 5/4) firm clay loam, moderate coarse prismatic structure, common roots and rootlets, few snail shells, common CaCO <sub>3</sub> filaments, common voids, common fecal pellets, common fine sand-filled root or worm casts, lower boundary not observed. Early to middle Holocene Fort Hood alluvium, Bwk horizon.

**Site 41CV1122**

Backhoe Trench 1, east wall

1	0–26 cm	Very dark grayish brown (10YR 3/2) friable fine sandy loam, moderate coarse angular blocky structure, many roots and rootlets, common snail shells, common voids, common fecal pellets, few dispersed gravels, clear smooth lower boundary. Late Holocene West Range alluvium, A horizon.
2	26–60 cm	Dark gray (10YR 4/1) friable loam, moderate medium angular blocky structure, many pieces of culturally burned rock, many snail shells, common roots and rootlets, many CaCO <sub>3</sub> filaments that increase in

Zone	Depth (cm)	Description
		frequency with depth, few voids, few fecal pellets, abrupt smooth lower boundary. Late Holocene West Range alluvium, Bk horizon.
3	60–92 cm	Light yellowish brown (10YR 6/4) firm clay loam, moderate medium angular blocky structure, many CaCO <sub>3</sub> filaments, many snail shells, common voids, common fecal pellets, few rootlets, few dispersed gravels, abrupt smooth lower boundary. Early to middle Fort Hood alluvium, Ck horizon.
4	92+ cm	Lower Cretaceous Glen Rose limestone, R horizon.

Backhoe Trench 2, east wall

1	0–38 cm	Very dark gray (10YR 3/1) firm clay loam, weak to moderate medium angular blocky structure, many roots and rootlets, common snail shells, common chert debitage, common voids, common fecal pellets, common pieces of culturally burned rock, clear smooth lower boundary. Late Holocene West Range alluvium, A horizon.
2	38–72 cm	Dark grayish brown (10YR 4/2) firm clay loam, moderate medium angular blocky structure, many roots and rootlets, many snail shells, common pieces of culturally burned rock, common voids, common fecal pellets, few CaCO <sub>3</sub> filaments, clear smooth lower boundary. Late Holocene West Range alluvium, B horizon.
3	72–122 cm	Dark grayish brown (10YR 4/2) firm clay loam, weak coarse prismatic breaking to moderate coarse angular blocky structure, common roots and rootlets, common snail shells, few pieces of culturally burned rock, few freshwater mussel shell fragments, many CaCO <sub>3</sub> filaments, clear smooth lower boundary. Late Holocene West Range alluvium, Bwk horizon.
4	122–193 cm	Brown (10YR 5/3) firm clay loam, weak coarse prismatic breaking to moderate coarse angular blocky structure, common matrix-supported gravels, common roots and rootlets, common snail shells, many CaCO <sub>3</sub> filaments, clear smooth lower boundary. Early to middle Holocene Fort Hood alluvium and colluvium, 2Bwkb horizon.
5	193–308+ cm	Light yellowish brown (10YR 6/4) firm silty clay loam, moderate medium angular blocky structure, few roots and rootlets, few snail shells, common matrix-supported gravels, lower boundary not observed. Early to middle Holocene Fort Hood alluvium and colluvium, 2C horizon.

Backhoe Trench 3, west wall

1	0–27 cm	Dark grayish brown (10YR 4/2) firm silty clay loam, moderate medium angular blocky structure, many roots and rootlets, common voids, common fecal pellets, thin gravel bed at 27 cm, abrupt smooth lower boundary. Late Holocene West Range alluvium, A horizon.
2	27–58 cm	Very dark gray (10YR 3/1) firm clay loam, moderate medium angular blocky structure, many CaCO <sub>3</sub> filaments, many roots and rootlets, few pieces of

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Zone	Depth (cm)	Description
		charcoal, few snail shells, common voids, common fecal pellets, gradual smooth lower boundary. Late Holocene West Range alluvium, 2Abk horizon.
3	58–196+ cm	Brown (10YR 5/3) grading to yellowish brown (10YR 5/4) firm gravelly clay loam, moderate coarse prismatic structure, many CaCO <sub>3</sub> filaments, common roots and rootlets, common snail shells, lower boundary not observed. Early to middle Holocene Fort Hood alluvium, 2Bck horizon.

**Site 41CV1133**

Backhoe Trench 1, east wall

1	0–33 cm	Black (10YR 2/1) firm silty clay loam, moderate medium angular blocky structure, many roots and rootlets, many voids, many fecal pellets, many organic materials, common snail shells, many pieces of culturally burned rock, clear smooth to wavy lower boundary. Late Holocene anthropogenic deposit, A horizon.
2	33–79 cm	Very dark grayish brown (10YR 3/2) firm silty clay loam, moderate medium angular blocky structure, common roots and rootlets, common CaCO <sub>3</sub> filaments, few snail shells, many pieces of culturally burned rock, few voids, few fecal pellets, clear smooth to wavy lower boundary. Late Holocene anthropogenic deposit, Bk horizon.
3	79–131+ cm	Yellowish brown (10YR 5/4) friable very gravelly sandy clay, few roots and rootlets, lower boundary not observed. Early to middle Holocene Fort Hood alluvium, 2C horizon.

Backhoe Trench 3, west wall

1	0–130 cm	Rounded, clast-supported gravels in a brown to dark brown (10YR 4/3) clay loam matrix, abrupt smooth lower boundary. Early to middle Holocene Fort Hood alluvium, A-Bw horizons.
2	130–250 cm	Yellowish brown (10YR 5/4) muddy fine sand, thin to medium clast-supported gravel beds at 160, 210, 243, and 250 cm. Early to middle Holocene Fort Hood alluvium, C horizon.
3	250–325+ cm	Yellowish brown (10YR 5/4) firm fine sandy clay loam. Early to middle Holocene Fort Hood alluvium, C2 horizon.

Backhoe Trench 4, west wall

1	0–26 cm	Dark brown (10YR 3/3) firm silty clay loam, moderate coarse angular blocky structure, many roots and rootlets, common snail shells, few dispersed gravels, many voids, many fecal pellets, few CaCO <sub>3</sub> filaments in lower half of zone, gradual smooth lower boundary. Early to middle Holocene Fort Hood alluvium, A horizon.
2	26–106 cm	Brown (10YR 5/3) firm silty clay loam, moderate to strong coarse

Zone	Depth (cm)	Description
		subangular blocky structure, common roots and rootlets, few snail shells, common dispersed gravels, thin gravel bed at 67 cm, common voids, common fecal pellets, many $\text{CaCO}_3$ filaments, abrupt smooth lower boundary. Early to middle Holocene Fort Hood alluvium, Bwk horizon.
3	106–116 cm	Brown (10YR 5/3) very gravelly clay loam, structureless, few roots and rootlets, common $\text{CaCO}_3$ coatings on clasts, abrupt smooth lower boundary. Early to middle Holocene Fort Hood alluvium, Bwk2 horizon.
4	116–168 cm	Brown (10YR 5/3) firm clay loam, moderate medium to coarse subangular blocky structure, few rootlets, common $\text{CaCO}_3$ filaments, common voids, common fecal pellets, very thin gravel beds at 136 and 146 cm, abrupt smooth lower boundary. Early to middle Holocene Fort Hood alluvium, Bwk3 horizon.
5	168–193 cm	Yellowish brown (10YR 5/4) firm very gravelly sandy mud, few rootlets, thin $\text{CaCO}_3$ coatings on clasts, abrupt smooth lower boundary. Early to middle Holocene Fort Hood alluvium, Ck horizon.
6	193–253 cm	Brown (10YR 5/3) firm fine sandy clay loam, weak coarse prismatic breaking to moderate coarse angular blocky structure, few snail shells, few traces of leached carbonates, few voids, few fecal pellets, clear smooth lower boundary. Early to middle Holocene Fort Hood alluvium, 2Bwb horizon.
7	253–285 cm	Light yellowish brown (10YR 6/4) friable fine sandy clay, moderate coarse angular blocky structure, few rootlets, few snail shells, few voids, abrupt smooth lower boundary. Early to middle Holocene Fort Hood alluvium, 2C horizon.
8	285–337+ cm	Light yellowish brown (10YR 6/4) very friable upward coarsening gravelly sand. Early to middle Holocene Fort Hood alluvium, 2C2 horizon.

#### Site 41CV1137

##### Backhoe Trench 1, west wall

1	0–83 cm	Yellowish brown (10YR 5/4) firm clay loam, moderate coarse angular blocky structure, few $\text{CaCO}_3$ filaments, common traces of leached carbonates, common roots and rootlets, few snail shells, common voids, few dispersed gravels, common fecal pellets, clear smooth lower boundary. Early to middle Holocene Fort Hood alluvium, A horizon.
2	83–144 cm	Brown to dark brown (7.5YR 4/3) very firm clay, moderate medium angular blocky structure, few dispersed gravels, common $\text{CaCO}_3$ nodules (5–10 mm in size), few rootlets, few voids, abrupt smooth lower boundary. Early to middle Holocene Fort Hood alluvium, Btk horizon.
3	144–192 cm	Light yellowish brown (10YR 6/4) firm very gravelly silty clay loam, structureless, thin $\text{CaCO}_3$ coatings on clasts, abrupt smooth lower boundary. Late Pleistocene to early Holocene Georgetown alluvium, 2Bb horizon.

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<b>Zone</b>	<b>Depth (cm)</b>	<b>Description</b>
4	192–287+ cm	Light yellowish brown (10YR 6/4) firm fine sandy clay loam, moderate medium angular blocky structure, few voids, common pedotubules, common traces of leached carbonates, lower boundary not observed. Late Pleistocene to early Holocene Georgetown alluvium, 2Btb horizon.

Backhoe Trench 2, north wall

1	0–104 cm	Dark brown (10YR 3/3) firm clay loam, moderate very fine subangular blocky structure, common roots and rootlets, common dispersed gravels, few voids, few CaCO <sub>3</sub> filaments, common traces of leached carbonates, common fecal pellets, gradual smooth lower boundary. Early to middle Holocene Fort Hood alluvium, A horizon.
2	104–185 cm	Strong brown (7.5YR 4/6) very firm silty clay loam, moderate medium angular blocky structure, few roots and rootlets, few dispersed gravels, common traces of leached carbonates, common CaCO <sub>3</sub> filaments in lower half of zone, few voids, abrupt smooth lower boundary. Early to middle Holocene Fort Hood alluvium, Bw horizon.
3	185–220+ cm	Light yellowish brown (10YR 6/4) firm fine sandy clay loam, moderate medium angular blocky structure, few rootlets, few CaCO <sub>3</sub> filaments, few voids, common pedotubules, lower boundary not observed. Late Pleistocene to early Holocene Georgetown alluvium, 2Btb horizon.

**Site 41CV1138**

Backhoe Trench 2, east wall

1	0–29 cm	Yellowish brown (10YR 5/4) friable sand, moderate medium angular blocky structure, few distinct fine mottles (7.5YR 5/6), many roots and rootlets, few fine voids, common pedotubules, abrupt smooth to wavy lower boundary. Late Holocene colluvium, A horizon.
2	29–53 cm	Reddish brown (5YR 4/4) very firm sandy clay loam, strong coarse angular blocky structure, common roots and rootlets, few fine voids, abrupt smooth lower boundary. Late Pleistocene/Holocene colluvium, 2Bt horizon.
3	53–104 cm	Strong brown (7.5YR 5/6) firm sandy clay loam, strong coarse angular blocky structure, few roots and rootlets, few fine voids, abrupt smooth lower boundary. Late Pleistocene colluvium, 3BC horizon.
4	104–138+ cm	Lower Cretaceous Paluxy sandstone, R horizon.

**Site 41CV1143**

Roadcut west of Test Unit 1

1	0–37 cm	Dark brown (10YR 3/3) friable loamy fine sand, weak fine angular blocky structure, common prominent coarse mottles (7.5YR 5/6) in lower half of
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Zone	Depth (cm)	Description
		zone, many roots and rootlets, few pieces of charcoal, few pedotubules, abrupt smooth lower boundary. Late Holocene colluvium, A horizon.
2	37–56+ cm	Strong brown (7.5YR 5/6) firm sandy clay loam, strong coarse angular blocky structure, common roots and rootlets, few pieces of charcoal, common pedotubules, few voids, lower boundary not observed. Late Pleistocene/Holocene colluvium, 2Bt horizon.

#### Site 41CV1152

##### Backhoe Trench 3, north wall

1	0–33 cm	Very dark grayish brown (10YR 3/2) firm clay, moderate medium angular blocky structure, common roots and rootlets, clear smooth lower boundary. Late Pleistocene Jackson alluvium and minor contributions of Holocene colluvium and alluvium, A horizon.
2	33–65 cm	Dark grayish brown (10YR 4/2) firm clay, weak coarse prismatic breaking to moderate medium angular blocky structure, few roots and rootlets, few pedotubules, few voids, few slickensides on ped faces, abrupt smooth lower boundary. Late Pleistocene Jackson alluvium and minor contributions of Holocene colluvium and alluvium, Bss horizon.
3	65–129 cm	Light brownish gray (10YR 6/2) friable gravelly sandy mud, moderate fine angular blocky structure, common distinct medium mottles (10YR 6/6), common fine voids, many pedotubules, abrupt smooth lower boundary. Late Pleistocene Jackson alluvium, C horizon.
4	129–170 cm	Rounded, clast-supported gravels, very abrupt smooth lower boundary. Late Pleistocene Jackson alluvium, C2 horizon.
5	170–238+ cm	Very pale brown (10YR 7/3) firm fine sandy clay loam, lower boundary not observed. Lower Cretaceous Walnut Formation, R horizon.

##### Backhoe Trench 4, north wall

1	0–53 cm	Very dark gray (10YR 3/1) very firm clay, moderate medium angular blocky structure, common slickensides on ped faces, common roots and rootlets, few pedotubules, clear smooth lower boundary. Late Pleistocene Jackson alluvium and minor contributions of Holocene colluvium and alluvium, A horizon.
2	53–113 cm	Grayish brown (10YR 5/2) very firm clay, moderate medium angular blocky structure, common slickensides on ped faces, few roots and rootlets, common pedotubules, common vertically oriented pieces of chert debitage, abrupt smooth lower boundary. Late Pleistocene Jackson alluvium and minor contributions of Holocene colluvium and alluvium, Bss horizon.
3	113–123+ cm	Pale yellow (2.5Y 7/4) firm silty clay, moderate medium angular blocky structure, common CaCO <sub>3</sub> nodules, lower boundary not observed. Late



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<b>Zone</b>	<b>Depth (cm)</b>	<b>Description</b>
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Pleistocene Jackson alluvium, Ck horizon.

Test Unit 1, east wall

- |   |          |  |
|---|----------|--|
| 1 | 0-22 cm  | Very dark grayish brown (10YR 3/2) firm gravelly clay loam, moderate coarse angular blocky structure, many roots and rootlets, few voids, few fecal pellets, gradual smooth lower boundary. Late Pleistocene Jackson alluvium and minor contributions of Holocene alluvium and colluvium, A horizon.   |
| 2 | 22-39 cm | Dark grayish brown (10YR 4/2) firm gravelly clay loam, moderate medium angular blocky structure, common roots and rootlets, few voids, common CaCO <sub>3</sub> filaments on ped faces, few fecal pellets, few pedotubules, clear smooth to wavy lower boundary. Late Pleistocene Jackson alluvium and minor contributions of Holocene alluvium and colluvium, Bkss horizon. |
| 3 | 39-50 cm | Brown to dark brown (10YR 4/3) firm very gravelly clay, structureless, lower boundary not observed. Late Pleistocene Jackson alluvium, BC horizon.   |

Test Unit 2, east wall

- |   |           |   |
|---|-----------|---|
| 1 | 0-20 cm   | Very dark gray (7.5YR 3/0) firm clay loam, moderate medium angular blocky structure, many roots and rootlets, common voids, common fecal pellets, few pedotubules, gradual smooth lower boundary. Late Pleistocene Jackson alluvium and minor contributions of Holocene alluvium and colluvium, A horizon.                        |
| 2 | 20-68 cm  | Dark grayish brown (10YR 4/2) very firm clay, moderate coarse angular blocky structure, common roots and rootlets, few matrix-supported gravels, common fecal pellets, common pedotubules, clear smooth lower boundary. Late Pleistocene Jackson alluvium and minor contributions of Holocene alluvium and colluvium, Bw horizon. |
| 3 | 68-75+ cm | Very pale brown (10YR 7/4) firm gravelly silty clay, structureless, few roots and rootlets, lower boundary not observed. Late Pleistocene Jackson alluvium, C horizon.  |

Test Unit 4, east wall

- |   |          |  |
|---|----------|--|
| 1 | 0-16 cm  | Dark gray (10YR 4/1) firm clay loam, moderate medium angular blocky structure, many roots and rootlets, common fecal pellets, common voids, common sand-sized carbonate clasts, few pedotubules, clear smooth lower boundary. Late Holocene alluvium, A horizon.                               |
| 2 | 16-35 cm | Dark grayish brown (10YR 4/2) firm clay loam, moderate medium angular blocky structure, common roots and rootlets, common sand-sized carbonate clasts, few fecal pellets, few dispersed gravels, few voids, few pedotubules, abrupt smooth lower boundary. Late Holocene alluvium, Bw horizon. |

Zone	Depth (cm)	Description
3	35–63 cm	Black (10YR 2/1) very firm gravelly clay, moderate coarse prismatic breaking to moderate medium angular blocky structure, common roots and rootlets, few pedotubules, few CaCO <sub>3</sub> filaments on ped faces, clear smooth lower boundary. Late Holocene alluvium, 2Ab horizon.
4	63–82+ cm	Dark gray (10YR 4/1) very firm gravelly clay, moderate coarse prismatic breaking to strong coarse angular blocky structure, few roots and rootlets, few fecal pellets, few pedotubules, common CaCO <sub>3</sub> filaments on ped faces, lower boundary not observed. Late Holocene alluvium, 2Bwkb horizon.

#### Site 41CV1191

##### Backhoe Trench 1, north wall

1	0–38 cm	Dark gray (10YR 4/1) very firm clay loam, moderate medium subangular blocky structure, many roots and rootlets, common dispersed gravels, few voids, common fecal pellets, few snail shells, gradual smooth lower boundary. Late Holocene West Range alluvium, A horizon.
2	38–101 cm	Dark grayish brown (10YR 4/2) firm silty clay loam, moderate medium angular blocky structure, common roots and rootlets, common dispersed gravels, common CaCO <sub>3</sub> filaments, few snail shells, few voids, abrupt smooth lower boundary. Late Holocene West Range alluvium, Bwk horizon.
3	101–122 cm	Brown (10YR 5/3) firm gravelly clay loam, moderate medium angular blocky structure, few roots and rootlets, few fine voids, many CaCO <sub>3</sub> filaments, abrupt smooth to wavy lower boundary. Late Holocene West Range alluvium, Ck horizon.
4	122–184+ cm	Lower Cretaceous Glen Rose limestone, R horizon.

#### Site 41CV1194

##### Backhoe Trench 1, east wall

1	0–50 cm	Very dark grayish brown (10YR 3/2) firm clay loam, moderate medium angular blocky structure, many roots and rootlets, common dispersed gravels, few voids, clear smooth lower boundary. Late Holocene West Range alluvium, A horizon.
2	50–103 cm	Very dark grayish brown (10YR 3/2) firm clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, common roots and rootlets, common CaCO <sub>3</sub> filaments, few dispersed gravels, clear smooth lower boundary. Late Holocene West Range alluvium, Bwk horizon.
3	103–148 cm	Grayish brown (10YR 5/2) firm gravelly silty clay loam, moderate medium angular blocky structure, many CaCO <sub>3</sub> filaments, few rootlets, abrupt

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Zone	Depth (cm)	Description
		smooth lower boundary, Late Holocene West Range alluvium, Ck horizon.
4	148+ cm	Lower Cretaceous Glen Rose limestone, R horizon.

**Site 41CV1206**

Backhoe Trench 1

1	0–14 cm	Very dark grayish brown (10YR 3/2) firm clay loam, moderate coarse angular blocky structure, many roots and rootlets, common voids, few fecal pellets, common pedotubules, many sand-sized carbonate clasts, clear smooth lower boundary. Late Holocene upper West Range/Ford alluvium, A horizon.
2	14–40 cm	Dark brown (7.5YR 3/2) firm clay loam, moderate coarse angular blocky structure, common roots and rootlets, common CaCO <sub>3</sub> filaments on ped faces, common fecal pellets, common pedotubules, many sand-sized carbonate clasts, abrupt wavy lower boundary. Late Holocene upper West Range/Ford alluvium, Bw horizon.
3	40–73+ cm	Lower Cretaceous Glen Rose limestone, R horizon.

Backhoe Trench 2, west wall

1	0–31 cm	Dark gray (10YR 4/1) firm clay loam, moderate medium angular blocky structure, many roots and rootlets, common sand-sized carbonate clasts, few fecal pellets, gradual smooth lower boundary. Late Holocene Ford alluvium, A horizon.
2	31–55 cm	Very dark grayish brown (10YR 3/2) very firm clay loam, moderate coarse angular blocky structure, many roots and rootlets, common fecal pellets, common pedotubules, few voids, many sand-sized carbonate clasts, abrupt smooth lower boundary. Late Holocene Ford alluvium, Bw horizon.
3	55–88 cm	Dark grayish brown (10YR 4/2) very firm sandy clay loam, moderate medium subangular blocky structure, common roots and rootlets, thin gravel bed at 60 cm, common dispersed gravels, few voids, many pedotubules, many sand-sized carbonate clasts, abrupt smooth lower boundary. Late Holocene Ford alluvium, Bw2 horizon.
4	88–118 cm	Very dark gray (10YR 3/1) firm gravelly clay loam, moderate medium angular blocky structure, common roots and rootlets, many CaCO <sub>3</sub> filaments on ped faces, common sand-sized carbonate clasts, few voids, clear smooth lower boundary. Late Holocene West Range alluvium, 2Abk horizon.
5	118–193 cm	Dark grayish brown (10YR 4/2) firm clay loam, moderate coarse prismatic breaking to moderate medium angular blocky structure, few roots and rootlets, common dispersed gravels, few voids, few pedotubules, abrupt smooth lower boundary. Late Holocene West Range alluvium, 2Bwb horizon.

Zone	Depth (cm)	Description
6	193–203+ cm	Light brownish gray (10YR 6/2) firm very gravelly clay loam, lower boundary not observed. Late Holocene West Range alluvium, 2C horizon.

Backhoe Trench 3, east wall

1	0–53 cm	Very dark gray (7.5YR 3/1) firm clay loam, moderate medium angular blocky structure, few dispersed gravels, many roots and rootlets, few pieces of charcoal, common voids, common fecal pellets, gradual smooth lower boundary. Late Holocene Ford alluvium, A horizon.
2	53–93 cm	Very dark grayish brown (10YR 3/2) firm gravelly sandy clay loam, moderate medium angular blocky structure, common voids, common fecal pellets, common roots and rootlets, clear smooth lower boundary. Late Holocene colluvium, Bw horizon.
3	93–134 cm	Dark brown (7.5YR 3/2) firm very gravelly clay loam, moderate medium angular blocky structure, few roots and rootlets, common voids, few fecal pellets, common CaCO <sub>3</sub> filaments on ped faces and gravels, clear smooth lower boundary. Late Holocene colluvium, Bwk horizon.
4	134–176 cm	Dark grayish brown (10YR 4/2) firm very gravelly clay loam, moderate medium angular blocky structure, few rootlets, few CaCO <sub>3</sub> filaments, few traces of leached carbonates, gradual smooth lower boundary. Late Holocene colluvium, C horizon.
5	176–240+ cm	Brown to dark brown (10YR 4/3) firm clay loam, moderate medium angular blocky structure, common pedotubules, common voids, few dispersed gravels, burned rock feature with charcoal and ashy sediment at 215–240 cm, lower boundary not observed. Early to middle Holocene Fort Hood alluvium, 2Ab horizon.

**Site 41CV1211**

Backhoe Trench 1, north wall

1	0–126 cm	Intercalated thin beds of very dark grayish brown (10YR 3/2) firm sandy clay loam and brown to dark brown (10YR 4/3) friable muddy fine to coarse sand, many roots and rootlets, many voids, common fecal pellets, common CaCO <sub>3</sub> filaments, abrupt smooth lower boundary. Late Holocene Ford alluvium, AC horizon.
2	126–172+ cm	Moderately-sorted, rounded, clast-supported gravels, lower boundary not observed. Late Holocene Ford alluvium, C horizon.

Backhoe Trench 3, west wall

1	0–27 cm	Grayish brown (10YR 5/2) firm clay loam, moderate medium angular blocky structure, many roots and rootlets, common fine voids, common fecal pellets, clear smooth lower boundary. Late Holocene lower West Range alluvium, A horizon.
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<b>Zone</b>	<b>Depth (cm)</b>	<b>Description</b>
2	27–75 cm	Light yellowish brown (10YR 6/4) firm silty clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, many roots and rootlets, common $\text{CaCO}_3$ filaments on ped faces, common fecal pellets, few voids, common dispersed gravels in lower half of zone, clear smooth lower boundary. Late Holocene lower West Range alluvium, Bwk horizon.
3	75–128 cm	Upward coarsening, rounded, clast-supported gravels, abrupt smooth lower boundary. Late Holocene lower West Range alluvium, C horizon.
4	128–224 cm	Yellowish brown (10YR 5/4) very firm clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, few rootlets, few dispersed gravels, many $\text{CaCO}_3$ filaments, few fecal pellets, clear smooth lower boundary. Early to middle Holocene Fort Hood alluvium, 2Bwkb horizon.
5	224–291 cm	Light yellowish brown (10YR 6/4) very firm clay, moderate medium angular blocky structure, few small $\text{CaCO}_3$ nodules, common traces of leached carbonates, few voids, clear smooth lower boundary. Early to middle Holocene Fort Hood alluvium, 2C horizon.
6	291–301+ cm	Yellowish brown (10YR 5/4) firm clay loam to sandy clay loam, moderate medium angular blocky structure, common traces of leached carbonates, lower boundary not observed. Early to middle Holocene Fort Hood alluvium, 3Bb horizon.

Backhoe Trench 5, east wall

1	0–53 cm	Very dark gray (10YR 3/1) firm clay loam, moderate medium angular blocky structure, many roots and rootlets, few $\text{CaCO}_3$ filaments on ped faces, many fecal pellets, few voids, few snail shells, gradual smooth lower boundary. Late Holocene Ford alluvium, A horizon.
2	53–88+ cm	Yellowish brown (10YR 5/4) firm gravelly clay loam, moderate medium angular blocky structure, few $\text{CaCO}_3$ filaments, few roots and rootlets, few voids, few fecal pellets, lower boundary not observed. Late Holocene lower West Range alluvium, Bw horizon.

**Site 41CV1218**

Backhoe Trench 1, east wall

1	0–54 cm	Dark grayish brown (10YR 4/2) very firm clay loam, strong coarse angular blocky structure, many roots and rootlets, common sand-sized carbonate clasts, few dispersed gravels, few voids, clear smooth lower boundary. Late Holocene West Range alluvium, A horizon.
2	54–74 cm	Brown to dark brown (10YR 4/3) very firm clay loam, strong medium angular blocky structure, common rootlets, few dispersed gravels, abrupt smooth lower boundary. Late Holocene West Range alluvium, Bw horizon.

Zone	Depth (cm)	Description
3	74–87 cm	Strong brown (7.5YR 4/6) firm very gravelly clay loam, structureless, few roots and rootlets, abrupt smooth lower boundary. Late Pleistocene Jackson alluvium, C horizon.
4	87–163 cm	Very pale brown (10YR 8/4) firm silty clay loam, moderate medium subangular blocky structure, common distinct coarse mottles (7.5YR 6/6), common voids, common fecal pellets, few dispersed gravels, abrupt smooth lower boundary. Late Pleistocene Jackson alluvium, 2Bwb horizon.
5	163–203+ cm	Light brownish gray (10YR 6/2) very firm sandy clay, moderate medium angular blocky structure, common prominent coarse mottles (10YR 7/6), common dispersed gravels, lower boundary not observed. Late Pleistocene Jackson alluvium, 2Cg horizon.

**Site 41CV1219**

Backhoe Trench 1, east wall

1	0–24 cm	Dark gray (10YR 4/1) firm clay loam, moderate coarse angular blocky structure, many roots and rootlets, few voids, few fecal pellets, abrupt smooth lower boundary. Late Holocene Ford alluvium, AC horizon.
2	24–66 cm	Very dark gray (10YR 3/1) firm clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, common roots and rootlets, few fine voids, many fecal pellets, common CaCO <sub>3</sub> filaments and coatings on ped faces, clear smooth lower boundary. Late Holocene Ford alluvium, 2Ab horizon.
3	66–100 cm	Grayish brown (10YR 5/2) firm clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, common roots and rootlets, common CaCO <sub>3</sub> filaments and coatings on ped faces, few charcoal flecks, few fecal pellets, thin sand bed at 100 cm, abrupt smooth lower boundary. Late Holocene Ford alluvium, 2Bkb horizon.
4	100–156 cm	Dark gray (10YR 4/1) firm clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, few roots and rootlets, few poorly preserved very thin sand beds, few dispersed gravels, common CaCO <sub>3</sub> filaments and coatings on ped faces, few voids, clear smooth lower boundary. Late Holocene Ford alluvium, 3Abk horizon.
5	156–195 cm	Very dark grayish brown (10YR 3/2) firm clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, common dispersed small gravels, common CaCO <sub>3</sub> filaments and coatings on ped faces, few roots and rootlets, clear smooth lower boundary. Late Holocene Ford alluvium, 4Abk horizon.
6	195–228 cm	Brown (10YR 5/3) very firm clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, common dispersed gravels, few CaCO <sub>3</sub> filaments, few rootlets, clear smooth lower boundary. Late Holocene Ford alluvium, 4Bwb horizon.

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<b>Zone</b>	<b>Depth (cm)</b>	<b>Description</b>
7	228–268+ cm	Light brownish gray (10YR 6/2) very firm clay loam, moderate medium angular blocky structure, many prominent medium mottles (10YR 5/4), many dispersed small gravels, lower boundary not observed. Late Holocene Ford alluvium, 4C horizon.

Backhoe Trench 2, west wall

1	0–38 cm	Dark grayish brown (10YR 4/2) firm clay loam, moderate coarse angular blocky structure, common roots and rootlets, few snail shells, many fine voids, many fecal pellets, clear smooth lower boundary. Late Holocene Ford alluvium, A horizon.
2	38–87 cm	Dark brown (10YR 3/3) firm clay loam, moderate medium angular blocky structure, few roots and rootlets, common fine voids, common fecal pellets, abrupt smooth lower boundary. Late Holocene Ford alluvium, Bw horizon.
3	87–196 cm	Brown (10YR 5/3) firm sandy clay loam, weak medium angular blocky structure, few roots and rootlets, many CaCO <sub>3</sub> filaments, common fecal pellets, common fine voids, abrupt smooth lower boundary. Late Holocene Ford alluvium, Ck horizon.
4	196–246 cm	Brown (10YR 5/3) firm sandy clay loam, weak coarse prismatic breaking to moderate coarse angular blocky structure, common fine voids, few roots and rootlets, few CaCO <sub>3</sub> filaments, few charcoal flecks, abrupt smooth lower boundary. Late Holocene Ford alluvium, C horizon.
5	246–287+ cm	Moderately-sorted, rounded, clast-supported gravels, lower boundary not observed. Late Holocene lower West Range alluvium, 2C horizon.

Backhoe Trench 3, west wall

1	0–33 cm	Very dark grayish brown (10YR 3/2) firm clay loam, moderate medium angular blocky structure, many roots and rootlets, few dispersed gravels, common fecal pellets, clear smooth lower boundary. Late Holocene Ford alluvium, A horizon.
2	33–105 cm	Dark brown (10YR 3/3) friable sandy clay loam, moderate medium angular blocky structure, common dispersed gravels, common roots and rootlets, few fecal pellets, few snail shells, clear smooth lower boundary. Late Holocene Ford alluvium, Bw horizon.
3	105–196 cm	Dark brown (10YR 3/3) firm clay loam, moderate medium angular blocky structure, many CaCO <sub>3</sub> filaments, common dispersed gravels, few roots and rootlets, abrupt wavy lower boundary. Late Holocene Ford alluvium, Bk horizon.
4	196–229 cm	Moderately-sorted, rounded, clast-supported gravels, abrupt wavy lower boundary. Late Holocene lower West Range alluvium, C horizon.
5	229–279+ cm	Very pale brown (10YR 7/4) firm sandy clay loam, strong medium angular

Zone	Depth (cm)	Description
		blocky structure, common distinct medium mottles (10YR 6/6), few dispersed gravels, many CaCO <sub>3</sub> filaments, lower boundary not observed. Late Holocene lower West Range alluvium, 2Bwkb horizon.

Backhoe Trench 5, north wall

1	0–25 cm	Very dark brown (10YR 2/2) friable silty clay loam, moderate medium subangular blocky structure, many roots and rootlets, few snail shells, few fine voids, few pieces of charcoal, clear smooth lower boundary. Late Holocene lower West Range/Ford alluvium, A horizon.
2	25–176 cm	Brown to dark brown (10YR 4/3) very firm clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, common roots and rootlets, few fine voids, common dispersed small gravels, few fecal pellets, gradual smooth lower boundary. Late Holocene lower West Range alluvium, Bw horizon.
3	176–251+ cm	Brown to dark brown (10YR 4/3) very firm clay, strong coarse angular blocky structure, few distinct fine mottles (7.5YR 5/6), few roots and rootlets, common CaCO <sub>3</sub> filaments, few dispersed gravels, lower boundary not observed. Late Holocene lower West Range alluvium, Bwk horizon.

Backhoe Trench 9, east wall

1	0–33 cm	Dark grayish brown (10YR 4/2) very firm clay loam, moderate coarse angular blocky structure, few dispersed gravels, many roots and rootlets, common fecal pellets, few voids, clear smooth lower boundary. Late Holocene Ford alluvium, A horizon.
2	33–55 cm	Yellowish brown (10YR 5/4) firm clay loam, moderate coarse angular blocky structure, common dispersed gravels, few snail shells, common roots and rootlets, many fine voids, few CaCO <sub>3</sub> filaments, abrupt smooth lower boundary. Late Holocene Ford alluvium, Bw horizon.
3	55–155 cm	Upward-fining, rounded, clast-supported gravels, abrupt smooth lower boundary. Late Holocene lower West Range alluvium, C horizon.
4	155–199 cm	Dark grayish brown (10YR 4/4) firm clay loam, moderate coarse prismatic structure, common dispersed gravels, common voids, few fecal pellets, few CaCO <sub>3</sub> filaments, clear smooth lower boundary. Late Holocene lower West Range alluvium, 2Ab horizon.
5	199–230 cm	Yellowish brown (10YR 5/4) firm clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, few snail shells, few rootlets, few voids, few dispersed gravels, common soft CaCO <sub>3</sub> nodules (2–5 mm), abrupt smooth lower boundary. Late Holocene lower West Range alluvium, 2Bwkb horizon.
6	230–257+ cm	Very pale brown (10YR 7/4) friable gravelly sandy loam, structureless, lower boundary not observed. Late Holocene lower West Range alluvium, 2C horizon.



<b>Zone</b>	<b>Depth (cm)</b>	<b>Description</b>
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**Site 41CV1221**

Backhoe Trench 1, north wall

1	0–30 cm	Very dark gray (10YR 3/1) firm clay loam, moderate medium subangular blocky structure, many roots and rootlets, few dispersed gravels, few fecal pellets, few pedotubules, clear smooth lower boundary. Late Holocene Ford alluvium, A horizon.
2	30–55 cm	Brown (10YR 5/3) firm clay loam, moderate medium angular blocky structure, common roots and rootlets, few dispersed gravels, gradual smooth lower boundary. Late Holocene Ford alluvium, Bw horizon.
3	55–90 cm	Dark grayish brown (10YR 4/2) firm clay loam, moderate medium angular blocky structure, common roots and rootlets, few dispersed gravels, abrupt smooth lower boundary. Late Holocene Ford alluvium, Bw2 horizon.
4	90–108+ cm	Rounded, clast-supported gravels, lower boundary not observed. Late Holocene lower West Range alluvium, C horizon.

Backhoe Trench 3, west wall

1	0–67 cm	Dark gray (10YR 4/1) very firm clay to clay loam, moderate medium subangular blocky structure, many roots and rootlets, few voids, common fecal pellets, abrupt smooth lower boundary. Late Holocene Ford alluvium, AC horizon.
2	67–107 cm	Very dark gray (10YR 3/1) firm clay loam, moderate medium angular blocky structure, many roots and rootlets, few CaCO <sub>3</sub> filaments, common pieces of charcoal, few voids, few fecal pellets, abrupt smooth lower boundary. Late Holocene Ford alluvium, 2Ab horizon.
3	107–151 cm	Dark grayish brown (10YR 4/2) firm gravelly clay loam, moderate medium angular blocky structure, common roots and rootlets, few pieces of charcoal, thin sand bed at 112 cm, abrupt wavy lower boundary. Late Holocene Ford alluvium, 2Bwb horizon.
4	151–155+ cm	Rounded, clast-supported gravels, lower boundary not observed. Late Holocene lower West Range alluvium, 2C horizon.

**Site 41CV1222**

Backhoe Trench 1, east wall

1	0–33 cm	Dark gray (10YR 4/1) firm clay loam, moderate medium angular blocky structure, many roots and rootlets, few dispersed gravels, few snail shells, few voids, few fecal pellets, abrupt wavy lower boundary. Late Holocene Ford alluvium, A horizon.
2	33–62 cm	Rounded, clast-supported gravels, abrupt smooth lower boundary. Late

Zone	Depth (cm)	Description
		Holocene Ford alluvium, C horizon.
3	62–96 cm	Dark brown (10YR 3/3) firm silty clay loam, moderate coarse granular structure, common roots and rootlets, few snail shells, few voids, few fecal pellets, few dispersed gravels, thin gravel bed at 96 cm, abrupt smooth lower boundary. Late Holocene Ford alluvium, 2ABb horizon.
4	96–142 cm	Dark gray (10YR 4/1) very firm loam, weak moderate coarse granular structure, common fine voids, few snail shells, few CaCO <sub>3</sub> filaments, common roots and rootlets, common fecal pellets, clear smooth lower boundary. Late Holocene Ford alluvium, 3Ab horizon.
5	142–197+ cm	Very dark grayish brown (2.5Y 3/2) firm loam, moderate fine angular blocky structure, few roots and rootlets, few CaCO <sub>3</sub> filaments, few voids, lower boundary not observed. Late Holocene Ford alluvium, 3Bwb horizon.

Backhoe Trench 2, west wall

1	0–103 cm	Dark gray (10YR 4/1) firm silty clay loam, weak coarse granular structure, common roots and rootlets, few dispersed gravels, few voids, clear smooth lower boundary. Late Holocene Ford alluvium, A horizon.
2	103–165 cm	Light brownish gray (10YR 6/2) firm silty clay loam, moderate medium angular blocky structure, few rootlets, common CaCO <sub>3</sub> filaments, thin gravel bed at 155 cm, common dispersed gravels, clear smooth lower boundary. Late Holocene Ford alluvium, Bwk horizon.
3	165–216+ cm	Light brownish gray (10YR 6/2) firm gravelly silty clay loam, moderate fine angular blocky structure, lower boundary not observed. Late Holocene Ford alluvium, C horizon.

Backhoe Trench 4, south wall

1	0–58 cm	Very dark gray (10YR 3/1) firm gravelly silty clay loam, moderate fine angular blocky structure, many roots and rootlets, common voids, few fecal pellets, clear smooth lower boundary. Late Holocene Ford alluvium, A horizon.
2	58–96 cm	Dark brown (10YR 3/3) firm silty clay loam, moderate medium angular blocky structure, common roots and rootlets, common dispersed gravels, few fine voids, abrupt smooth lower boundary. Late Holocene Ford alluvium, Bw horizon.
3	96–142 cm	Rounded, clast-supported gravels, abrupt smooth lower boundary. Late Holocene Ford alluvium, C horizon.
4	142–144+ cm	Brown (10YR 5/3) firm gravelly silty clay loam, moderate coarse granular structure, few CaCO <sub>3</sub> filaments, few snail shells, common fine voids, lower boundary not observed. Late Holocene lower West Range alluvium, 2Bwb horizon.

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<b>Zone</b>	<b>Depth (cm)</b>	<b>Description</b>
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Backhoe Trench 5, east wall

1	0–38 cm	Very dark gray (10YR 3/1) very firm clay loam, moderate medium angular blocky structure, many roots and rootlets, common sand-size carbonate clasts, common voids, abrupt smooth lower boundary. Late Holocene Ford alluvium, A horizon.
2	38–57 cm	Dark brown (10YR 3/3) firm sandy clay loam, weak fine angular blocky structure, common roots and rootlets, few snail shells, common voids, common fecal pellets, few dispersed gravels, abrupt smooth lower boundary. Late Holocene Ford alluvium, Bw horizon.
3	57–105 cm	Very dark grayish brown (10YR 3/2) grading to dark grayish brown (10YR 4/2) firm silty clay loam, weak coarse granular structure, common roots and rootlets, few CaCO <sub>3</sub> filaments, few fine voids, few snail shells, thin gravel bed at 105 cm, abrupt wavy lower boundary. Late Holocene lower West Range alluvium, 2Ab horizon.
4	105–203 cm	Light yellowish brown (10YR 6/4) firm sandy clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, few roots and rootlets, few snail shells, thin gravel bed at 149 cm, few CaCO <sub>3</sub> filaments, few fine voids, few fecal pellets, clear smooth lower boundary. Late Holocene lower West Range alluvium, 2Bwb horizon.
5	203–310+ cm	Light yellowish brown (2.5Y 6/4) firm gravelly sandy clay, weak coarse prismatic breaking to moderate medium angular blocky structure, common distinct coarse mottles (10YR 6/2) in lower half of zone, few rootlets, common fine voids, lower boundary not observed. Late Holocene lower West Range alluvium, 2Bwb2 horizon.

Backhoe Trench 6, south wall

1	0–25 cm	Very dark grayish brown (10YR 4/2) firm clay loam, moderate fine angular blocky structure, many roots and rootlets, few dispersed gravels, few fine voids, clear smooth lower boundary. Early to middle Holocene Fort Hood alluvium, A horizon.
2	25–73 cm	Brown (10YR 5/3) firm clay loam, weak coarse prismatic breaking to moderate fine subangular blocky structure, few dispersed gravels, common roots and rootlets, few snail shells, abrupt wavy lower boundary. Early to middle Holocene Fort Hood alluvium, Bw horizon.
3	73–114+ cm	Rounded, clast-supported gravels, lower boundary not observed. Early to middle Holocene Fort Hood alluvium, C horizon.

**Site 41CV1225**

Backhoe Trench 1, north wall

1	0–21 cm	Very dark grayish brown (10YR 3/2) firm very gravelly silty clay loam,
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Zone	Depth (cm)	Description
		structureless, common organic materials, many roots and rootlets, abrupt wavy lower boundary. Late Holocene lower West Range alluvium, A horizon.
2	21–50 cm	Slightly cemented, rounded, clast-supported gravels, abrupt wavy lower boundary. Early to middle Holocene Fort Hood/late Holocene lower West Range alluvium, Ck horizon.
3	50–68+ cm	Very pale brown (10YR 7/4) firm gravelly silty clay, structureless, common CaCO <sub>3</sub> filaments, lower boundary not observed. Early to middle Holocene Fort Hood/late Holocene lower West Range alluvium, Ck2 horizon.

Backhoe Trench 3, south wall

1	0–20 cm	Dark grayish brown (10YR 4/2) firm gravelly silty clay loam, moderate medium subangular blocky structure, many roots and rootlets, common voids, few fecal pellets, abrupt smooth to wavy lower boundary. Late Holocene lower West Range alluvium, A horizon.
2	20–31 cm	Very dark grayish brown (10YR 3/2) very firm clay loam, moderate medium platy structure, few dispersed gravels, common roots and rootlets, few fine voids, clear smooth lower boundary. Late Holocene lower West Range alluvium, 2Ab horizon.
3	31–60 cm	Brown to dark brown (10YR 4/3) very firm clay loam, moderate medium angular blocky structure, few dispersed gravels, common roots and rootlets, few fine voids, common faint CaCO <sub>3</sub> filaments on ped faces, few fecal pellets, gradual smooth lower boundary. Late Holocene lower West Range alluvium, 2Bwb horizon.
4	60–85 cm	Light yellowish brown (10YR 6/4) firm silty clay loam, moderate very coarse granular structure, common CaCO <sub>3</sub> filaments, few fecal pellets, few dispersed gravels, few roots and rootlets, diffuse smooth lower boundary. Late Holocene lower West Range alluvium, 2Ck horizon.
5	85–148 cm	Light yellowish brown (10YR 6/4) firm gravelly silty clay loam, structureless, common fine voids, common fecal pellets, few CaCO <sub>3</sub> filaments, few rootlets, clear smooth lower boundary. Late Holocene lower West Range alluvium, 2C horizon.
6	148–224+ cm	Very pale brown (10YR 7/3) friable very gravelly muddy sand, structureless, common prominent coarse mottles (10YR 6/8), lower boundary not observed. Early to middle Holocene Fort Hood alluvium, 3C horizon.

Backhoe Trench 5, north wall

1	0–43 cm	Dark gray (10YR 4/1) firm clay loam, moderate medium angular blocky structure, many roots and rootlets, few dispersed gravels, common voids, common fecal pellets, thin gravel bed at 43 cm, abrupt smooth lower boundary. Late Holocene lower West Range alluvium, A horizon.
2	43–115 cm	Yellowish brown (10YR 5/4) firm clay loam, moderate coarse granular

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Zone	Depth (cm)	Description
		structure, common dispersed gravels, few snail shells, thin gravel bed at 96 cm, few roots and rootlets, few CaCO <sub>3</sub> filaments, gradual smooth lower boundary. Late Holocene lower West Range alluvium, B horizon.
3	115–219 cm	Yellowish brown (10YR 5/4) firm silty clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, few rootlets, few dispersed gravels, many CaCO <sub>3</sub> filaments, common fine voids, few fecal pellets, abrupt smooth lower boundary. Late Holocene lower West Range alluvium, Bwk horizon.
4	219–289+ cm	Dark yellowish brown (10YR 4/4) firm gravelly silty clay loam, weak coarse granular structure, many voids, lower boundary not observed. Early to middle Holocene Fort Hood alluvium, 2Bwb horizon.

**Site 41CV1235**

Backhoe Trench 1, south wall

1	0–31 cm	Very dark grayish brown (10YR 3/2) firm clay loam, moderate medium angular blocky structure, many roots and rootlets, common voids, many fecal pellets, common sand-sized carbonate clasts, clear smooth lower boundary. Late Holocene Ford alluvium, A horizon.
2	31–148 cm	Dark gray (10YR 4/1) firm clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, many CaCO <sub>3</sub> filaments that decrease in frequency with depth, common roots and rootlets, few snail shells, few voids, few fecal pellets, few dispersed gravels, gradual smooth lower boundary. Late Holocene lower West Range alluvium, Bwk horizon.
3	148–225 cm	Pale brown (10YR 6/3) firm sandy clay loam, moderate medium subangular blocky structure, few roots and rootlets, common fine voids, common snail shells, few CaCO <sub>3</sub> filaments, abrupt smooth lower boundary. Late Holocene lower West Range alluvium, BC horizon.
4	225–235+ cm	Moderately-sorted, rounded, clast-supported gravels, lower boundary not observed. Late Holocene lower West Range alluvium, C horizon.

Backhoe Trench 3, south wall

1	0–30 cm	Dark gray (10YR 4/1) firm clay loam, moderate medium angular blocky structure, many roots and rootlets, common voids, many sand-sized carbonate clasts, common fecal pellets, common pieces of culturally burned rock at 30 cm, clear smooth lower boundary. Late Holocene Ford alluvium, A horizon.
2	30–49 cm	Dark grayish brown (10YR 4/2) very firm clay loam, moderate coarse granular structure, many sand-sized carbonate clasts, many fecal pellets, common voids, common roots and rootlets, common snail shells, few pieces of culturally burned rock, gradual smooth lower boundary. Late Holocene Ford alluvium, Bw horizon.

Zone	Depth (cm)	Description
3	49–154 cm	Yellowish brown (10YR 5/4) firm clay, weak coarse prismatic breaking to moderate medium angular blocky structure, few roots and rootlets, common $\text{CaCO}_3$ filaments, few dispersed gravels, few fine voids, few fecal pellets, clear smooth lower boundary. Early to middle Holocene Fort Hood alluvium, 2Bwkb horizon.
4	154–231 cm	Brownish yellow (10YR 6/6) firm sandy clay, moderate coarse granular structure, few $\text{CaCO}_3$ filaments, few rootlets, few fine voids, few pieces of culturally burned rock at 225 cm, clear smooth lower boundary. Early to middle Holocene Fort Hood alluvium, 2BCb horizon.
5	231–283+ cm	Light yellowish brown (10YR 6/4) very firm clay loam, moderate medium angular blocky structure, many distinct medium mottles (10YR 6/6), common dispersed gravels, common traces of leached carbonates, lower boundary not observed. Early to middle Holocene Fort Hood alluvium, 2C horizon.

Backhoe Trench 4, south wall

1	0–62 cm	Very dark gray (10YR 3/1) firm clay loam, moderate coarse granular structure, common roots and rootlets, common to many pieces of culturally burned rock in lower half of zone, common snail shells, few $\text{CaCO}_3$ filaments on ped faces in lower half of zone, few fine voids, common fecal pellets, gradual smooth lower boundary. Late Holocene lower West Range alluvium, A horizon.
2	62–157 cm	Yellowish brown (10YR 5/4) firm silty clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, common dispersed gravels, few rootlets, few snail shells, few $\text{CaCO}_3$ filaments that increase in frequency with depth, clear smooth lower boundary. Late Holocene lower West Range alluvium, Bw horizon.
3	157–238+ cm	Yellowish brown (10YR 5/4) firm clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, many $\text{CaCO}_3$ filaments, few fine voids, lower boundary not observed. Early to middle Holocene Fort Hood alluvium, Bwk horizon.

Backhoe Trench 5, east wall

1	0–58 cm	Black (7.5YR 2/0) firm silty clay loam, structureless, many pieces of densely-packed culturally burned rock, many roots and rootlets, many snail shells, common organic materials, common chert debitage, clear wavy lower boundary. Late Holocene colluvium and anthropogenic deposit, A horizon.
2	58–116 cm	Grayish brown (2.5Y 5/2) firm silty clay loam, weak coarse granular structure, common roots and rootlets, common snail shells, few pieces of culturally burned rock, 10–15-cm-thick zone of culturally burned rock at 116 cm, few fine voids, clear wavy lower boundary. Late Holocene colluvium, B horizon.
3	116–220+ cm	Very pale brown (10YR 7/4) firm gravelly clay loam, moderate medium

Zone	Depth (cm)	Description
		subangular blocky structure, common roots and rootlets, many voids, common fecal pellets, lower boundary not observed. Early to middle Holocene Fort Hood alluvium, Bw horizon.

**Site 41CV1250**

Backhoe Trench 2, east wall

1	0–65 cm	Dark gray (10YR 4/1) firm loam, moderate medium subangular blocky structure, many roots and rootlets, few dispersed gravels, common voids, common sand-sized carbonate clasts, few pieces of culturally burned rock, gradual smooth lower boundary. Late Holocene Ford alluvium, A horizon.
2	65–90 cm	Very dark grayish brown (10YR 3/2) firm loam, moderate medium angular blocky structure, common CaCO <sub>3</sub> filaments, few roots and rootlets, common dispersed gravels, common sand-sized carbonate clasts, abrupt wavy lower boundary. Late Holocene Ford alluvium, Bw horizon.
3	90–110 cm	Rounded, clast-supported gravels, abrupt wavy lower boundary. Late Holocene lower West Range alluvium, C horizon.
4	110–186 cm	Light yellowish brown (10YR 6/4) very firm sandy clay, moderate medium subangular blocky structure, few roots and rootlets, common dispersed gravels, many CaCO <sub>3</sub> filaments, few voids, clear smooth lower boundary. Late Holocene lower West Range alluvium, 2Bkb horizon.
5	186–236+ cm	Yellowish brown (10YR 5/4) firm clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, few CaCO <sub>3</sub> filaments, common traces of leached carbonates, few dispersed gravels, lower boundary not observed. Late Holocene lower West Range alluvium, 2Bwb horizon.

Backhoe Trench 3, south wall

1	0–42 cm	Dark grayish brown (2.5Y 4/2) very firm clay, weak coarse granular structure, many roots and rootlets, common fecal pellets, few snail shells, clear smooth lower boundary. Late Holocene Ford alluvium, A horizon.
2	42–80 cm	Grayish brown (2.5Y 5/2) very firm clay loam, moderate coarse granular structure, common roots and rootlets, common voids, few snail shells, abrupt smooth lower boundary. Late Holocene Ford alluvium, Bw horizon.
3	80–105 cm	Dark gray (10YR 4/1) very firm clay loam, moderate medium subangular blocky structure, common roots and rootlets, many CaCO <sub>3</sub> filaments, few snail shells, clear smooth lower boundary. Late Holocene upper West Range alluvium, 2Abk horizon.
4	105–221 cm	Dark grayish brown (2.5Y 4/2) firm silty clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, few pieces

Zone	Depth (cm)	Description
		of culturally burned rock at 133 cm, few roots and rootlets, many CaCO <sub>3</sub> filaments, few thin beds of sand-sized carbonate clasts, clear smooth lower boundary. Late Holocene upper West Range alluvium, 2Bwbk horizon.
5	221–256+ cm	Brown (10YR 5/3) to yellowish brown (10YR 5/4) firm sandy clay loam, moderate medium subangular blocky structure, few CaCO <sub>3</sub> filaments, common traces of leached carbonates, lower boundary not observed. Late Holocene upper West Range alluvium, 2BCb horizon.

Backhoe Trench 4, south wall

1	0–30 cm	Light yellowish brown (10YR 6/4) friable fine to coarse sand, weak coarse granular structure, many roots and rootlets, common organic materials, abrupt smooth lower boundary. Late Holocene Ford alluvium, Cu horizon.
2	30–51 cm	Dark gray (10YR 4/1) firm sandy clay loam, moderate medium angular blocky structure, common roots and rootlets, few dispersed gravels, few voids, few pedotubules, abrupt wavy lower boundary. Late Holocene Ford alluvium, 2Ab horizon.
3	51–88+ cm	Rounded, clast-supported gravels, lower boundary not observed. Late Holocene Ford alluvium, 2C horizon.

Backhoe Trench 5, south wall

1	0–35 cm	Very dark grayish brown (10YR 3/2) very firm clay loam, moderate medium subangular blocky structure, many roots and rootlets, few dispersed gravels, few voids, few fecal pellets, gradual smooth lower boundary. Early to middle Holocene Fort Hood alluvium, A horizon.
2	35–86 cm	Yellowish brown (10YR 5/4) firm clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, few CaCO <sub>3</sub> filaments, few dispersed gravels, common rootlets, common voids, common fecal pellets, abrupt wavy lower boundary. Early to middle Holocene Fort Hood alluvium, Bw horizon.
3	86–118 cm	Very pale brown (10YR 7/4) firm silty clay, moderate medium angular blocky structure, common distinct medium mottles (10YR 7/6), few rootlets, few CaCO <sub>3</sub> filaments, common pedotubules, few voids, common dispersed gravels, abrupt smooth lower boundary. Late Pleistocene to early Holocene Georgetown alluvium, 2Bwb horizon.
4	118–131 cm	Rounded, clast-supported gravels, abrupt smooth lower boundary. Late Pleistocene to early Holocene Georgetown alluvium, 2C horizon.
5	131–211+ cm	Very pale brown (10YR 7/4) firm sandy clay loam, strong medium angular blocky structure, common dispersed gravels, few voids, few pedotubules, thin gravel beds at 161, 189, and 206 cm, lower boundary not observed. Late Pleistocene to early Holocene Georgetown alluvium, 3Bwb horizon.



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**Zone      Depth (cm)      Description**

**Site 41CV1258**

Backhoe Trench 1, east wall

Profile 1

1	0–35 cm	Dark yellowish brown (10YR 4/4) friable fine sandy loam, weak fine angular blocky structure, common granule-sized limestone clasts, common roots and rootlets, few voids, gradual smooth lower boundary. Late Holocene colluvium, A horizon.
2	35–80 cm	Yellowish brown (10YR 5/4) friable sandy loam, weak fine angular blocky structure, few CaCO <sub>3</sub> filaments, common granule-sized limestone clasts, common roots and rootlets, few fine voids, clear smooth lower boundary. Late Holocene colluvium, Bw horizon.
3	80–150 cm	Strong brown (7.5YR 5/6) friable sandy loam to sandy clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, common CaCO <sub>3</sub> filaments, common granule- to cobble-sized limestone clasts (highly weathered), few roots and rootlets, common voids, clear smooth lower boundary. Late Pleistocene/Holocene colluvium, 2Btb horizon.
4	150–175 cm	Reddish yellow (7.5YR 6/6) friable sandy loam, weak fine angular blocky structure, few CaCO <sub>3</sub> filaments, few limestone clasts, few roots and rootlets, abrupt broken lower boundary. Late Pleistocene/Holocene colluvium, 2BCb horizon.
5	175–200 cm	Lower Cretaceous Paluxy sandstone and quartzite, R horizon.
6	200–230+ cm	Lower Cretaceous Glen Rose limestone, R horizon.

Profile 2

1	0–65 cm	Dark grayish brown (10YR 4/2) friable fine sandy loam, moderate fine angular blocky structure, common limestone clasts, common roots and rootlets, gradual smooth lower boundary. Late Holocene colluvium, A horizon.
2	65–132 cm	Yellowish brown (10YR 5/4) firm sandy loam, moderate fine angular blocky structure, common CaCO <sub>3</sub> filaments, few roots and rootlets, common limestone clasts, abrupt to clear smooth lower boundary. Late Holocene colluvium, Bk horizon.
3	132–180 cm	Reddish yellow (7.5YR 6/6) friable fine sandy loam, weak fine angular blocky structure, few CaCO <sub>3</sub> filaments, common limestone clasts, few roots and rootlets, abrupt smooth lower boundary. Late Pleistocene/Holocene colluvium, 2BCb horizon.
4	180–195+ cm	Lower Cretaceous Glen Rose limestone, R horizon.

Zone	Depth (cm)	Description
<u>Profile 3</u>		
1	0–12 cm	Dark grayish brown (10YR 4/2) friable sandy loam, weak medium granular structure, common distinct fine mottles (7.5YR 4/6), common roots and rootlets, few pedotubules, few fine voids, few granule-sized limestone clasts, clear smooth lower boundary. Late Holocene colluvium, A horizon.
2	12–40 cm	Strong brown (7.5YR 4/6) firm sandy loam to sandy clay loam, moderate very fine angular blocky structure, common faint medium mottles (10YR 4/4), common roots and rootlets, few voids, few granule-sized limestone clasts, common pedotubules, abrupt smooth lower boundary. Late Holocene colluvium, C horizon.
3	40–75 cm	Brown to dark brown (10YR 4/3) friable sandy clay loam, moderate medium angular blocky structure, few CaCO <sub>3</sub> filaments that increase in frequency with depth, common granule-sized limestone clasts, few roots and rootlets, clear smooth lower boundary. Late Holocene colluvium, 2Ab horizon.
4	75–122 cm	Brown to dark brown (7.5YR 4/4) firm sandy clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, common to many CaCO <sub>3</sub> filaments, few roots and rootlets, few voids, few pedotubules, clear smooth lower boundary. Late Pleistocene/Holocene colluvium, 3Btb horizon.
5	122–142 cm	Strong brown (7.5YR 5/6) friable sandy loam, moderate fine angular blocky structure, few CaCO <sub>3</sub> filaments, few granule- to pebble-sized limestone clasts, abrupt smooth lower boundary. Late Pleistocene/Holocene colluvium, 3BCb horizon.
6	142–164+ cm	Lower Cretaceous Glen Rose limestone, R horizon.
<u>Profile 4</u>		
1	0–13 cm	Very dark grayish brown (10YR 3/2) friable sandy loam, weak medium granular structure, few distinct fine mottles (7.5YR 4/6), common roots and rootlets, few granule-sized limestone clasts, few fine voids, abrupt smooth lower boundary. Late Holocene colluvium, A horizon.
2	13–92 cm	Yellowish red (5YR 5/6) firm sandy clay loam, strong medium angular blocky structure, few roots and rootlets, common pedotubules, few voids, clear smooth lower boundary. Late Pleistocene/Holocene colluvium, 2Btb horizon.
3	92–128 cm	Strong brown (7.5YR 5/6) firm sandy clay loam, moderate medium angular blocky structure, few roots and rootlets, few CaCO <sub>3</sub> filaments, common fine voids, few pedotubules, abrupt smooth to wavy lower boundary. Late Pleistocene/Holocene colluvium, 2BCb horizon.
4	128–145+ cm	Lower Cretaceous Glen Rose limestone, R horizon.

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<b>Zone</b>	<b>Depth (cm)</b>	<b>Description</b>
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Profile 5

1	0–25 cm	Very dark grayish brown (10YR 3/2) friable sandy loam, weak medium granular structure, few prominent medium mottles (5YR 5/8), common roots and rootlets, abrupt smooth lower boundary. Late Holocene colluvium, A horizon.
2	25–75 cm	Yellowish red (5YR 4/6) very firm sandy clay loam, strong coarse angular blocky structure, few roots and rootlets, common fine voids, common manganese stains on ped faces, common pedotubules, clear smooth lower boundary. Late Pleistocene/Holocene colluvium, 2Btb horizon.
3	75–98 cm	Yellowish red (5YR 5/8) firm sandy clay loam, weak fine subangular blocky structure, common fine voids, few pedotubules, few CaCO <sub>3</sub> filaments, abrupt smooth to wavy lower boundary. Late Pleistocene/Holocene colluvium, 2BCb horizon.
4	98–123+ cm	Lower Cretaceous Glen Rose limestone, R horizon.

Backhoe Trench 2, east wall

1	0–52 cm	Lower Cretaceous Walnut Formation, R horizon.
2	52–356 cm	Yellow (10YR 8/6) grading to white (10YR 8/2) very fine to fine quartz sand, common thin ripple to planar laminated beds, low- to intermediate-angle topset beds, common small iron concretions and ferruginous stains (7.5YR 7/8 and 2.5YR 5/8), few thin beds and thick laminae of white chalky material, sands become slightly lithified with depth. Lower Cretaceous Paluxy Formation, R horizon.
3	356+ cm	Lower Cretaceous Glen Rose limestone, R horizon.

Test Unit 2, north wall

1	0–44 cm	Dark grayish brown (10YR 4/2) friable fine sandy loam, moderate medium angular blocky structure, common roots and rootlets, common matrix-supported gravels, few fine voids, common fecal pellets, common pedotubules, gradual smooth lower boundary. Late Holocene colluvium, A horizon.
2	44–80+ cm	Brown (7.5YR 5/4) friable loam, moderate medium angular blocky structure, few roots and rootlets, common CaCO <sub>3</sub> filaments, few fine voids, common matrix-supported pieces of fragmented sandstone bedrock, lower boundary not observed. Late Holocene colluvium, Bk horizon.

Test Units 3 and 4, west wall

1	0–10 cm	Very dark grayish brown (10YR 3/2) friable fine sandy loam, moderate fine subangular blocky structure, many roots and rootlets, common voids, common fecal pellets, few pedotubules, clear smooth lower boundary. Late Holocene colluvium, A horizon.
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Zone	Depth (cm)	Description
2	10–36 cm	Brown to dark brown (7.5YR 4/4) firm sandy clay loam, moderate fine angular blocky structure, many distinct coarse mottles (10YR 3/2), common roots and rootlets, few fine voids, few pedotubules, abrupt smooth lower boundary. Late Holocene colluvium, C horizon.
3	36–105 cm	Brown to dark brown (10YR 4/3) friable fine sandy loam, moderate medium angular blocky structure, few CaCO <sub>3</sub> filaments, few rootlets, few matrix-supported sandstone gravels, common fine voids, clear wavy lower boundary. Late Holocene colluvium, 2Ab horizon.
4	105–120+ cm	Yellowish red (5YR 4/6) firm sandy clay loam, moderate coarse prismatic breaking to strong medium angular blocky structure, few rootlets, common voids, many CaCO <sub>3</sub> filaments, few pedotubules, lower boundary not observed. Late Pleistocene/Holocene colluvium, 3Btbk horizon.

Test Unit 5, west wall

1	0–21 cm	Very dark brown (10YR 2/2) friable loamy fine sand, weak fine angular blocky structure, common roots and rootlets, clear smooth lower boundary. Late Holocene colluvium, A horizon.
2	21–28+ cm	Dark reddish brown (5YR 3/4) very firm sandy clay loam, strong coarse angular blocky structure, common pedotubules, few manganese stains on ped faces, few roots and rootlets, lower boundary not observed. Late Pleistocene/Holocene colluvium, 2Bt horizon.

Test Unit 6, north wall

1	0–56 cm	Dark grayish brown (10YR 4/2) friable fine sandy loam, weak fine angular blocky structure, few prominent medium mottles (7.5YR 5/6), many roots and rootlets, few matrix-supported gravels, clear smooth lower boundary. Late Holocene colluvium, A horizon.
2	56–122+ cm	Brown to dark brown (7.5YR 4/4) friable loam, moderate medium angular blocky structure, few distinct coarse mottles (7.5YR 5/6), few roots and rootlets, few matrix-supported gravels, common voids, lower boundary not observed. Late Holocene colluvium, Bw horizon.

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Backhoe Trench 2, west wall

1	0–40 cm	Dark gray (10YR 4/1) very firm clay loam, structureless, many roots and rootlets, many snail shells, common matrix-supported gravels, many voids, clear wavy lower boundary. Late Holocene colluvium, A horizon.
2	40–61 cm	Grayish brown (10YR 5/2) very firm clay loam, structureless, common roots and rootlets, many snail shells, common matrix-supported gravels, abrupt wavy lower boundary. Late Holocene colluvium, C horizon.

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<b>Zone</b>	<b>Depth (cm)</b>	<b>Description</b>
3	61–82 cm	Dark gray (10YR 4/1) firm clay loam, weak coarse granular structure, common snail shells, common roots and rootlets, few matrix-supported gravels, few voids, few fecal pellets, abrupt smooth lower boundary. Late Holocene colluvium, 2Ab horizon.
4	82–130 cm	Very dark gray (10YR 3/1) firm silty clay loam, moderate very coarse granular structure, common roots and rootlets, common pieces of culturally burned rock, common matrix-supported gravels, common snail shells, common voids, very abrupt smooth lower boundary. Late Holocene colluvium, 3Ab horizon.
5	130–195+ cm	Pale brown (10YR 6/3) firm clay loam, moderate medium angular blocky structure, common CaCO <sub>3</sub> filaments, common matrix-supported gravels, few pieces of culturally burned rock and charcoal, few snail shells, few fine voids, lower boundary not observed. Late Holocene lower West Range alluvium (overbank facies grading to a gravelly channel fill facies to the north) and colluvium, 4C horizon.

Backhoe Trench 5, west wall

1	0–28 cm	Very dark gray (10YR 3/1) firm clay loam, weak coarse granular structure, common roots and rootlets, common dispersed gravels, many voids, many fecal pellets, abrupt wavy lower boundary. Late Holocene Ford alluvium, A horizon.
2	28–64 cm	Rounded, clast-supported gravels, abrupt smooth lower boundary. Late Holocene lower West Range alluvium, C horizon.
3	64–98 cm	Dark gray (10YR 4/1) firm clay loam, moderate fine angular blocky structure, few roots and rootlets, few snail shells, few CaCO <sub>3</sub> filaments, few voids, few fecal pellets, common dispersed gravels, gradual smooth lower boundary. Late Holocene lower West Range alluvium, 2Ab horizon.
4	98–178 cm	Dark grayish brown (10YR 4/2) firm loam, weak medium prismatic breaking to moderate fine angular blocky structure, few rootlets, few CaCO <sub>3</sub> filaments, few voids, few dispersed gravels in lower half of zone, abrupt smooth lower boundary. Late Holocene lower West Range alluvium, 2Bwb horizon.
5	178–275+ cm	Rounded, clast-supported gravels, lower boundary not observed. Late Holocene lower West Range alluvium, 2C horizon.

Backhoe Trench 6, west wall

1	0–40 cm	Dark gray (10YR 4/1) firm clay loam, moderate medium angular blocky structure, common sand-sized carbonate clasts, many roots and rootlets, common dispersed gravels, few voids, common fecal pellets, clear smooth lower boundary. Late Holocene Ford alluvium, A horizon.
2	40–61 cm	Grayish brown (10YR 5/2) firm silty clay loam, weak coarse granular structure, common dispersed gravels, many roots and rootlets, few voids,

Zone	Depth (cm)	Description
		common fecal pellets, abrupt wavy to broken lower boundary. Late Holocene Ford alluvium, B horizon.
3	61–74 cm	Rounded, clast-supported gravels, abrupt wavy to broken lower boundary. Late Holocene lower West Range alluvium, 2Cu horizon.
4	74–131 cm	Very pale brown (10YR 7/3) firm gravelly muddy sand, structureless, few rootlets, common voids, few CaCO <sub>3</sub> filaments, medium gravel bed at 131 cm, abrupt wavy to broken lower boundary. Late Holocene lower West Range alluvium, 2C horizon.
5	131–230+ cm	Light yellowish brown (10YR 6/4) friable muddy sand, structureless, common dispersed gravels, common snail shells, few rootlets, common voids, lower boundary not observed. Late Holocene lower West Range alluvium, 2C2 horizon.

Backhoe Trench 7, north wall

1	0–70 cm	Very dark gray (10YR 3/1) firm silty clay loam, structureless, many roots and rootlets, many pieces of culturally burned rock, common snail shells, few organic materials, common fecal pellets, few voids, abrupt smooth to wavy lower boundary. Late Holocene anthropogenic deposit and colluvium, A horizon.
2	70+ cm	Lower Cretaceous Walnut Formation, R horizon.

**Site 41CV1275**

North Cutbank of House Creek

1	0–50 cm	Very dark gray (10YR 3/1) firm gravelly silty clay loam, clear smooth lower boundary. Late Holocene upper West Range/Ford alluvium, A horizon.
2	50–151 cm	Very dark grayish brown (10YR 3/2) firm gravelly silty clay loam, common CaCO <sub>3</sub> filaments, abrupt smooth lower boundary. Late Holocene upper West Range/Ford alluvium, Bwk horizon.
3	151–166 cm	Dark gray (10YR 4/1) firm gravelly silty clay loam, abrupt smooth lower boundary. Late Holocene upper West Range alluvium, 2Ab horizon.
4	166–336+ cm	Lower Cretaceous Glen Rose limestone, R horizon.

Backhoe Trench 1, east wall

1	0–34 cm	Very dark gray (10YR 3/1) firm clay loam, moderate medium angular blocky structure, many roots and rootlets, few dispersed gravels, few voids, common fecal pellets, few pedotubules, clear smooth lower boundary. Late Holocene upper West Range alluvium, A horizon.
2	34–101 cm	Dark grayish brown (10YR 4/2) firm gravelly clay loam, weak medium

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Zone	Depth (cm)	Description
		prismatic breaking to moderate medium angular blocky structure, common roots and rootlets, common voids, abrupt smooth lower boundary. Late Holocene upper West Range alluvium, Bw horizon.
3	101–160+ cm	Brown (10YR 5/3) firm gravelly silty clay loam, moderate coarse granular structure, common distinct medium mottles (10YR 6/6), few rootlets, lower boundary not observed. Late Holocene upper West Range alluvium, C horizon.

Backhoe Trench 2, east wall

1	0–41 cm	Black (10YR 2/1) firm clay loam, moderate coarse granular structure, many roots and rootlets, many pieces of fragmented bedrock, abrupt wavy to broken lower boundary. Late Holocene upper West Range alluvium, A horizon.
2	41+ cm	Lower Cretaceous Glen Rose limestone, R horizon.

Backhoe Trench 4, south wall

1	0–31 cm	Dark gray (10YR 4/1) firm loam, moderate medium subangular blocky structure, many voids, common roots and rootlets, few snail shells, many fecal pellets, common sand-sized carbonate clasts, gradual smooth lower boundary. Late Holocene lower West Range alluvium, A horizon.
2	31–113 cm	Yellowish brown (10YR 5/4) firm clay loam, weak coarse prismatic breaks to moderate medium angular blocky structure, few roots and rootlets, few dispersed gravels, few voids, abrupt smooth lower boundary. Late Holocene lower West Range alluvium, Bw horizon.
3	113–136 cm	Rounded, clast-supported gravels, abrupt smooth lower boundary. Late Holocene lower West Range alluvium, C horizon.
4	136–166 cm	Brown (10YR 5/3) friable silty clay loam, moderate coarse granular structure, many prominent coarse mottles (10YR 4/2), few roots and rootlets, common voids, few fecal pellets, abrupt smooth lower boundary. Early to middle Holocene Fort Hood alluvium, 2Ab horizon.
5	166–226+ cm	Pale yellow (2.5Y 7/4) friable silt clay to silt, strong fine angular blocky structure, few prominent fine mottles (10YR 6/8), few roots and rootlets, many fine voids, few dispersed gravels, common traces of leached carbonates, thin gravel bed at 199 cm, upper 20 cm of zone is slightly cemented with carbonates, lower boundary not observed. Late Pleistocene to early Holocene Georgetown alluvium, 3Btb horizon.

Backhoe Trench 5, north wall

1	0–20 cm	Very dark grayish brown (10YR 3/2) firm loam, weak coarse granular structure, many roots and rootlets, common fecal pellets, few voids, many sand-sized carbonate clasts, gradual smooth lower boundary. Late Holocene Ford alluvium, A horizon.
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Zone	Depth (cm)	Description
2	20–73 cm	Dark brown (10YR 3/3) firm clay loam, weak coarse granular structure, common roots and rootlets, clear smooth lower boundary. Late Holocene Ford alluvium, Bw horizon.
3	73–132 cm	Very dark grayish brown (10YR 3/2) firm clay loam, weak medium angular blocky structure, common roots and rootlets, few dispersed gravels, few voids, abrupt wavy lower boundary. Late Holocene upper West Range alluvium, 2Ab horizon.
4	132–147+ cm	Yellowish brown (10YR 5/4) firm gravelly clay, structureless, few CaCO <sub>3</sub> filaments, lower boundary not observed. Late Holocene lower West Range alluvium, 2Cu horizon.

Backhoe Trench 6, south wall

1	0–27 cm	Dark grayish brown (10YR 4/2) friable very gravelly clay loam, structureless, many roots and rootlets, few pieces of charcoal, clear smooth lower boundary. Late Holocene lower West Range alluvium, A horizon.
2	27–120 cm	Brown to dark brown (10YR 4/3) firm loam, weak fine subangular blocky structure, common CaCO <sub>3</sub> filaments, common dispersed gravels, few roots and rootlets, common fine voids, thin gravel bed at 106 cm, clear smooth lower boundary. Late Holocene lower West Range alluvium, Bk horizon.
3	120–143 cm	Brown (10YR 5/3) very firm gravelly clay loam, moderate medium angular blocky structure, few faint coarse mottles (10YR 5/4), few roots and rootlets, clear smooth lower boundary. Late Holocene lower West Range alluvium, Bw horizon.
4	143–176 cm	Brown (10YR 5/3) firm silty clay loam, moderate medium angular blocky structure, common distinct coarse mottles (10YR 6/8), few dispersed gravels, common fine voids, clear smooth lower boundary. Late Pleistocene to early Holocene Georgetown alluvium/Royalty paleosol, 2Btb horizon.
5	176–281+ cm	Very pale brown (10YR 7/4) firm coarse sandy clay grading into friable sandy loam, moderate medium angular blocky structure, many distinct coarse mottles (10YR 6/6), many fine voids, few dispersed gravels, lower boundary not observed. Late Pleistocene to early Holocene Georgetown alluvium, 2Cox horizon.

Backhoe Trench 8, east wall

1	0–20 cm	Very dark grayish brown (10YR 3/2) firm gravelly clay loam, moderate medium angular blocky structure, many roots and rootlets, clear smooth lower boundary. Late Holocene lower West Range alluvium, A horizon.
2	20–56 cm	Brown to dark brown (10YR 4/3) friable very gravelly silty clay loam, structureless, common roots and rootlets, gradual smooth lower boundary. Late Holocene lower West Range alluvium, B horizon.
3	56–161 cm	Yellowish brown (10YR 5/4) firm clay loam, weak medium prismatic



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Zone	Depth (cm)	Description
		breaking to moderate medium angular blocky structure, few roots and rootlets, common dispersed gravels, many CaCO <sub>3</sub> filaments, abrupt smooth lower boundary. Late Holocene lower West Range alluvium, Bwk horizon.
4	161–198 cm	Brown (10YR 5/3) firm very gravelly clay loam, structureless, few roots and rootlets, few CaCO <sub>3</sub> filaments, abrupt smooth lower boundary. Late Holocene lower West Range alluvium, C horizon.
5	198–262 cm	Very pale brown (10YR 7/4) firm silty clay, moderate medium subangular blocky structure, common faint medium mottles (10YR 7/6), few dispersed gravels, common voids, abrupt smooth lower boundary. Late Pleistocene to early Holocene Georgetown alluvium/Royalty paleosol, 2Btb horizon.
6	262–302+ cm	Very pale brown (10YR 7/4) firm very gravelly sandy clay, structureless, common distinct medium mottles (10YR 8/6), lower boundary not observed. Late Pleistocene to early Holocene Georgetown alluvium, 2C horizon.

Backhoe Trench 9, south wall

1	0–47 cm	Dark grayish brown (10YR 4/2) very firm clay loam, moderate fine subangular blocky structure, common roots and rootlets, few dispersed gravels, common pedotubules, gradual smooth lower boundary. Early to middle Holocene Fort Hood alluvium, A horizon.
2	47–121 cm	Brown (10YR 5/3) very firm clay, moderate medium angular structure, few roots and rootlets, few dispersed gravels, clear smooth lower boundary. Early to middle Holocene Fort Hood alluvium, Bw horizon.
3	121–210 cm	Dark brown (7.5YR 3/4) to reddish brown (5YR 4/3) very firm clay, strong coarse angular blocky structure, few roots and rootlets, few dispersed gravels, few slickensides on ped faces, abrupt smooth lower boundary. Early to middle Holocene Fort Hood alluvium, Bw2 horizon.
4	210–282 cm	Yellow (10YR 7/6) firm silty clay loam, moderate medium angular blocky structure, common distinct coarse mottles (10YR 5/4), few dispersed gravels, many fine voids, abrupt smooth lower boundary. Late Pleistocene to early Holocene Georgetown alluvium, 2Btb horizon.
5	282–302+ cm	Brownish yellow (10YR 6/6) firm gravelly sandy clay, structureless, lower boundary not observed. Late Pleistocene to early Holocene Georgetown alluvium, 2C horizon.

Backhoe Trench 10, south wall

1	0–19 cm	Very dark grayish brown (10YR 3/2) very firm clay loam, moderate medium subangular blocky structure, common roots and rootlets, few dispersed gravels, clear smooth lower boundary. Late Holocene lower West Range alluvium, A horizon.
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Zone	Depth (cm)	Description
2	19–79 cm	Brown to dark brown (10YR 4/3) very firm silty clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, common roots and rootlets, few dispersed gravels, few pedotubules, clear smooth lower boundary. Late Holocene lower West Range alluvium, Bw horizon.
3	79–127 cm	Light gray (10YR 7/2) firm silty clay, moderate medium angular blocky structure, few prominent medium mottles (10YR 7/6), few dispersed gravels, few CaCO <sub>3</sub> filaments, abrupt smooth lower boundary. Late Holocene lower West Range alluvium, Cox horizon.
4	127–140+ cm	Very pale brown (10YR 7/3) firm very gravelly silty clay, structureless, lower boundary not observed. Late Pleistocene to early Holocene Georgetown alluvium, 2C horizon.

Backhoe Trench 13, east wall

1	0–31 cm	Very dark gray (10YR 3/1) firm clay loam, moderate medium angular blocky structure, few dispersed gravels, many roots and rootlets, common fecal pellets, few snail shells, clear smooth lower boundary. Late Holocene lower West Range alluvium, A horizon.
2	31–56 cm	Dark brown (7.5YR 3/3 to 10YR 3/3) firm silty clay loam, moderate medium angular blocky structure, common pieces of culturally burned rock, common fecal pellets, common roots and rootlets, common dispersed gravels, abrupt wavy lower boundary. Late Holocene lower West Range alluvium, Bw horizon.
3	56–206 cm	Yellowish brown (10YR 5/4) firm muddy gravel, abrupt wavy lower boundary. Late Pleistocene to early Holocene Georgetown alluvium, 2C horizon.
4	206+ cm	Lower Cretaceous Glen Rose limestone, R horizon.

**Site 41CV1282**

Backhoe Trench 1, south wall

1	0–34 cm	Dark grayish brown (10YR 4/2) firm clay loam, weak medium platy structure, common dispersed gravels, many sand-sized carbonate clasts, common roots and rootlets, gradual smooth lower boundary. Late Holocene Ford alluvium, AC horizon.
2	34–73 cm	Very dark grayish brown (10YR 3/2) firm clay loam, weak coarse granular structure, few roots and rootlets, common sand-sized carbonate clasts, few pedotubules, few dispersed gravels, abrupt smooth lower boundary. Late Holocene upper West Range alluvium, 2Ab horizon.
3	73–89 cm	Rounded, clast-supported gravels, abrupt smooth lower boundary. Late Holocene lower West Range alluvium, 3Cu horizon.

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<b>Zone</b>	<b>Depth (cm)</b>	<b>Description</b>
4	89–161+ cm	Very pale brown (10YR 7/3) firm clay, moderate medium subangular blocky structure, few dispersed gravels, few CaCO <sub>3</sub> filaments, common sand-sized carbonate clasts, lower boundary not observed. Late Holocene lower West Range alluvium, 3Bwb horizon.

Backhoe Trench 3, east wall

1	0–57 cm	Very dark grayish brown (10YR 3/2) firm loam, weak medium subangular blocky structure, many roots and rootlets, many sand-sized carbonate clasts, common voids, few fecal pellets, clear smooth lower boundary. Late Holocene upper West Range alluvium, A horizon.
2	57–110 cm	Brown (10YR 5/3) firm gravelly clay loam, weak medium granular structure, common roots and rootlets, many sand-sized carbonate clasts, clear smooth lower boundary. Late Holocene lower West Range alluvium, B horizon.
3	110–131+ cm	Grayish brown (2.5Y 5/2) firm gravelly clay, structureless, few faint medium mottles (2.5Y 6/4), common CaCO <sub>3</sub> filaments, few roots and rootlets, lower boundary not observed. Late Holocene lower West Range alluvium, Cg horizon.

Backhoe Trench 4, north wall

1	0–70 cm	Very dark gray (10YR 3/1) firm loam, weak medium subangular blocky structure, many roots and rootlets, few dispersed gravels, common sand-sized carbonate clasts, few voids, abrupt smooth lower boundary. Late Holocene upper West Range alluvium, A horizon.
2	70–97 cm	Rounded, clast-supported gravels, abrupt smooth lower boundary. Late Holocene lower West Range alluvium, 2Cu horizon.
3	97–171+ cm	Grayish brown (10YR 5/2) very firm gravelly clay, moderate medium angular blocky structure, common faint medium mottles (10YR 6/4) in lower half of zone, few rootlets, few CaCO <sub>3</sub> filaments, lower boundary not observed. Late Holocene lower West Range alluvium, 2Bwb horizon.

**Site 41CV1283**

Test Unit 2, east wall

1	0–20 cm	Dark gray (10YR 4/1) friable silty loam, moderate medium subangular blocky structure, many roots and rootlets, few matrix-supported gravels, common fecal pellets, few voids, clear smooth lower boundary. Holocene colluvium, A horizon.
2	20–34+ cm	Yellowish brown (10YR 5/4) firm silty clay, moderate medium angular blocky structure, few faint coarse mottles (10YR 4/2), common matrix-supported gravels, common roots and rootlets, lower boundary not observed. Late Pleistocene colluvium, C horizon.

**Zone      Depth (cm)      Description**

**Site 41CV1286**

Backhoe Trench 1, south wall

- |   |            |  |
|---|------------|--|
| 1 | 0–25 cm    | Very dark grayish brown (10YR 3/2) friable very gravelly silty clay loam, structureless, many roots and rootlets, common organic materials, clear wavy to broken lower boundary. Late Holocene colluvium, A horizon.                           |
| 2 | 25–70 cm   | Brownish yellow (10YR 6/6) friable gravelly silty clay loam, weak coarse granular structure, common roots and rootlets, common voids, clear smooth lower boundary. Late Holocene colluvium, Bw horizon.  |
| 3 | 70–223+ cm | Yellowish brown (10YR 5/4) firm gravelly clay loam, weak coarse granular structure, few roots and rootlets, common CaCO <sub>3</sub> filaments, few snail shells, few voids, lower boundary not observed. Late Holocene colluvium, Bk horizon. |

Backhoe Trench 3, east wall

- |   |             |   |
|---|-------------|---|
| 1 | 0–66 cm     | Very dark grayish brown (10YR 3/2) very firm clay loam, moderate medium subangular blocky structure, common roots and rootlets, common sand-sized carbonate clasts, few voids, few pieces of charcoal, poorly preserved thin gravel bed at 66 cm, abrupt smooth lower boundary. Late Holocene Ford alluvium, A horizon. |
| 2 | 66–127 cm   | Very dark grayish brown (10YR 3/2) firm clay moderate medium angular blocky structure, common roots and rootlets, few sand-sized carbonate clasts, few voids, few pedotubules, common fecal pellets, gradual smooth lower boundary. Late Holocene Ford alluvium, 2ABb horizon.  |
| 3 | 127–216+ cm | Gray (10YR 5/1) firm silty clay loam, moderate medium angular blocky structure, common faint medium mottles (5Y 4/3), few dispersed gravels, few rootlets, common fine voids, few CaCO <sub>3</sub> nodules, lower boundary not observed. Late Holocene Ford alluvium, 2Bwb horizon.                                    |

Backhoe Trench 4, south wall

- |   |            |   |
|---|------------|---|
| 1 | 0–29 cm    | Brown (10YR 5/3) friable gravelly sandy loam, structureless, many roots and rootlets, few poorly preserved laminated structures, common pedotubules, very abrupt smooth lower boundary. Late Holocene Ford alluvium, Cu horizon.                                |
| 2 | 29–117 cm  | Dark gray (10YR 4/1) firm clay loam, moderate medium angular blocky structure, common roots and rootlets, few voids, few CaCO <sub>3</sub> filaments, many sand-sized carbonate clasts, clear smooth lower boundary. Late Holocene Ford alluvium, 2Abk horizon. |
| 3 | 117–163 cm | Dark gray (10YR 4/1) firm clay loam, weak medium prismatic breaking to moderate medium angular blocky structure, many CaCO <sub>3</sub> filaments, common voids, few rootlets, clear smooth lower boundary. Late Holocene Ford alluvium, 2Bwkb horizon.         |

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Zone	Depth (cm)	Description
4	163–213 cm	Dark gray (10YR 4/1) friable silty clay loam, weak medium prismatic breaking to moderate fine angular blocky structure, many traces of leached carbonates, few voids, abrupt smooth lower boundary. Late Holocene Ford alluvium, 2Bwb horizon.
5	213–230 cm	Light yellowish brown (10YR 6/4) firm gravelly sandy clay, structureless, abrupt smooth lower boundary. Late Holocene lower West Range alluvium, 3C horizon.
6	230–267+ cm	Gray (10YR 5/1) firm clay loam, strong medium angular blocky structure, common dispersed gravels, common voids, lower boundary not observed. Late Holocene lower West Range alluvium, 4Ab horizon.

Backhoe Trench 5, south wall

1	0–55 cm	Very dark grayish brown (2.5Y 3/2) firm gravelly silty clay loam, weak coarse granular structure, many roots and rootlets, common voids, common fecal pellets, gradual smooth lower boundary. Late Holocene colluvium, A horizon.
2	55–167 cm	Dark grayish brown (2.5Y 4/2) firm gravelly silty clay loam, weak coarse granular structure, common roots and rootlets, few voids, clear smooth lower boundary. Late Holocene colluvium, B horizon.
3	167–200+ cm	Light yellowish brown (2.5Y 6/4) firm gravelly clay loam, weak coarse granular structure, few roots and rootlets, lower boundary not observed. Late Holocene colluvium, C horizon.

Backhoe Trench 6, west wall

1	0–25 cm	Very dark grayish brown (10YR 3/2) firm silty clay loam, moderate medium subangular blocky structure, common roots and rootlets, few dispersed gravels, few voids, gradual smooth lower boundary. Late Holocene lower West Range alluvium, A horizon.
2	25–96 cm	Yellowish brown (10YR 5/4) firm gravelly silty clay loam, weak medium prismatic breaking to moderate medium angular blocky structure, common roots and rootlets, common voids, few CaCO <sub>3</sub> filaments, abrupt smooth lower boundary. Late Holocene lower West Range alluvium, Bw horizon.
3	96–165 cm	Brownish yellow (10YR 6/6) friable very gravelly sandy clay, structureless, common CaCO <sub>3</sub> filaments, common CaCO <sub>3</sub> coatings on gravels, few roots and rootlets, abrupt smooth lower boundary. Early to middle Holocene colluvium, 2C horizon.
4	165–191 cm	Brown (7.5YR 5/4) firm gravelly clay loam, moderate medium subangular blocky structure, few roots and rootlets, common traces of leached carbonates, clear smooth lower boundary. Early to middle Holocene Fort Hood alluvium, 3Ab horizon.
5	191–261 cm	Light yellowish brown (10YR 6/4) firm gravelly clay loam, weak coarse

Zone	Depth (cm)	Description
		prismatic breaking to moderate medium angular blocky structure, many traces of leached carbonates, abrupt smooth lower boundary. Early to middle Holocene Fort Hood alluvium, 3Bwb horizon.
6	261–276+ cm	Light yellowish brown (10YR 6/4) firm very gravelly clay loam, structureless, common CaCO <sub>3</sub> coatings on gravels, lower boundary not observed. Early to middle Holocene colluvium, 3Ck horizon.

Backhoe Trench 8, north wall

1	0–35 cm	Dark gray (10YR 4/1) very firm gravelly clay loam, weak fine subangular blocky structure, common roots and rootlets, few voids, gradual smooth lower boundary. Late Holocene colluvium, A horizon.
2	35–60 cm	Grayish brown (10YR 5/2) firm silty clay loam, moderate medium angular blocky structure, few roots and rootlets, few matrix-supported gravels, few voids, clear smooth lower boundary. Late Holocene lower West Range alluvium and colluvium, Bw horizon.
3	60–108 cm	Brown (10YR 5/3) very firm gravelly clay loam, moderate medium angular blocky structure, few roots and rootlets, few voids, few pedotubules, few CaCO <sub>3</sub> filaments, gradual smooth lower boundary. Late Holocene colluvium, Bwk horizon.
4	108–148 cm	Yellowish brown (10YR 5/4) firm silty clay loam, weak coarse prismatic breaking to moderate medium angular blocky structure, common CaCO <sub>3</sub> filaments, clear smooth lower boundary. Early to middle Holocene Fort Hood alluvium, 2Bwkb horizon.
5	148–178 cm	Light yellowish brown (10YR 6/4) firm sandy clay loam, moderate medium angular blocky structure, few dispersed gravels, common CaCO <sub>3</sub> filaments, abrupt smooth lower boundary. Early to middle Holocene Fort Hood alluvium, 2Ck horizon.
6	178–210 cm	Light yellowish brown (10YR 6/4) firm very gravelly clay loam, structureless, common CaCO <sub>3</sub> coatings on gravels, abrupt smooth lower boundary. Early to middle Holocene colluvium, 3Ck horizon.
7	210–240 cm	Yellowish brown (10YR 5/4) firm very gravelly clay loam, structureless, common thin CaCO <sub>3</sub> coatings on gravels, abrupt smooth lower boundary. Early to middle Holocene colluvium, 4Ck horizon.
8	240–265+ cm	Yellowish brown (10YR 5/4) firm silty clay loam, moderate coarse angular blocky structure, few distinct coarse mottles (10YR 7/4), lower boundary not observed. Early to middle Holocene Fort Hood alluvium, 5Bwb horizon.

Backhoe Trench 9, south wall

1	0–29 cm	Grayish brown (10YR 5/2) friable silty clay loam, weak fine subangular blocky structure, common roots and rootlets, few small gravels, clear smooth lower boundary. Late Holocene lower West Range alluvium, A horizon.
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*National Register Testing at Fort Hood: The 1996 Season*

<b>Zone</b>	<b>Depth (cm)</b>	<b>Description</b>
2	29–60 cm	Brown (10YR 5/3) firm gravelly silty clay, weak coarse prismatic breaking to moderate medium angular blocky structure, common roots and rootlets, few $\text{CaCO}_3$ filaments, clear smooth lower boundary. Late Holocene colluvium, Bw horizon.
3	60–107 cm	Yellowish brown (10YR 5/4) firm gravelly silty clay, weak coarse prismatic breaking to moderate medium angular blocky structure, few roots and rootlets, few $\text{CaCO}_3$ filaments, abrupt smooth lower boundary. Late Holocene colluvium, Bw2 horizon.
4	107–132 cm	Strong brown (7.5YR 5/6) firm gravelly silty clay loam, moderate medium angular blocky structure, common distinct medium mottles (10YR 5/2), clear smooth lower boundary. Early to middle Holocene colluvium, 2Ab horizon.
5	132–195 cm	Brown (7.5YR 5/4) firm gravelly clay loam, weak medium prismatic breaking to moderate medium angular blocky structure, many distinct coarse mottles (10YR 5/2), few iron-manganese concretions, abrupt smooth lower boundary. Early to middle Holocene colluvium, 2Bwb horizon.
6	195–225+ cm	Very pale brown (10YR 7/4) firm silty clay, moderate medium subangular blocky structure, lower boundary not observed. Late Pleistocene to early Holocene Georgetown alluvium, 3Btb horizon.

Test Units 3 and 8, east wall

1	0–10 cm	Dark brown (10YR 3/3) firm silty clay loam, structureless, many roots and rootlets, few dispersed gravels, clear smooth lower boundary. Late Holocene Ford alluvium, A horizon.
2	10–15 cm	Dark gray (10YR 4/1) firm gravelly clay loam, structureless, common roots and rootlets, clear smooth lower boundary. Late Holocene colluvium, C horizon.
3	15–21 cm	Dark gray (10YR 4/1) firm silty clay loam, weak fine subangular blocky structure, common roots and rootlets, few dispersed gravels, few pieces of charcoal, clear smooth lower boundary. Late Holocene Ford alluvium, 2Ab horizon.
4	21–26 cm	Very dark grayish brown (10YR 3/2) firm gravelly clay loam, structureless, common roots and rootlets, clear smooth lower boundary. Late Holocene colluvium, 2C horizon.
5	26–44 cm	Dark gray (10YR 4/1) very firm silty clay loam, weak fine subangular blocky structure, common roots and rootlets, few pieces of charcoal, clear smooth lower boundary. Late Holocene Ford alluvium, 3Ab horizon.
6	44–63+ cm	Dark grayish brown (10YR 4/2) firm silty clay loam, weak fine subangular blocky structure, few roots and rootlets, lower boundary not observed. Late Holocene Ford alluvium, 3Bwb horizon.

Zone	Depth (cm)	Description
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**Site 41CV1287**

Test Unit 1, west wall

1	0–15 cm	Dark grayish brown (10YR 4/2) firm gravelly clay loam, structureless, many roots and roots, common organic materials, abrupt wavy to broken lower boundary. Holocene colluvium, A horizon.
2	15+ cm	Lower Cretaceous Glen Rose limestone, R horizon.

Test Unit 4, south wall

1	0–18 cm	Dark grayish brown (10YR 4/2) firm silty loam, weak medium angular blocky structure, many roots and rootlets, common matrix-supported gravels, clear smooth lower boundary. Holocene colluvium, A horizon.
2	18–46+ cm	Pale brown (10YR 6/3) firm silty clay, moderate medium angular blocky structure, common voids, common fecal pellets, common roots and rootlets, common small weathered limestone gravels, lower boundary not observed. Holocene colluvium, Bw horizon.

Test Unit 6, east wall

1	0–24 cm	Dark gray (10YR 4/1) firm silty clay, moderate medium blocky structure, many roots and rootlets, few voids, common fecal pellets, abrupt smooth lower boundary. Holocene colluvium, A horizon.
2	24–31+ cm	Brown to dark brown (10YR 4/3) friable very gravelly clay, structureless, few roots and rootlets, lower boundary not observed. Holocene colluvium, Bw horizon.

**Site 41CV1308**

Backhoe Trench 1, south wall

1	0–50 cm	Very dark grayish brown (2.5Y 3/2) firm clay loam, weak medium granular structure, many roots and rootlets, few dispersed gravels, many sand-sized carbonate clasts, thin gravel bed at 50 cm, clear smooth lower boundary. Late Holocene Ford alluvium, A horizon.
2	50–102 cm	Dark grayish brown (2.5Y 4/2) firm gravelly clay loam, weak fine subangular blocky structure, common roots and rootlets, few CaCO <sub>3</sub> filaments, thin gravel bed at 102 cm, abrupt smooth lower boundary. Late Holocene Ford alluvium, Bw horizon.
3	102–137 cm	Dark gray (10YR 4/1) very firm clay, moderate medium angular blocky structure, common dispersed gravels, few CaCO <sub>3</sub> filaments, few sand-sized carbonate clasts, few roots and rootlets, clear smooth lower boundary. Late Holocene lower West Range alluvium, 2Ab horizon.



Zone	Depth (cm)	Description
4	137–170+ cm	Dark gray (10YR 4/1) firm very gravelly clay, structureless, few roots and rootlets, common CaCO <sub>3</sub> filaments, lower boundary not observed. Late Holocene lower West Range alluvium, 2C horizon.

Backhoe Trench 2, north wall

1	0–40 cm	Very dark gray (10YR 3/1) firm clay loam, moderate coarse granular structure, many roots and rootlets, few dispersed gravels, many sand-sized carbonate clasts, abrupt smooth lower boundary. Late Holocene Ford alluvium, A horizon.
2	40–52 cm	Rounded, clast-supported gravels, abrupt smooth lower boundary. Late Holocene Ford alluvium, Cu horizon.
3	52–112 cm	Olive (5Y 5/3) firm clay loam, moderate medium subangular blocky structure, few roots and rootlets, few dispersed gravels, gradual smooth lower boundary. Late Holocene Ford alluvium, 2Ab horizon.
4	112–130+ cm	Olive gray (5Y 5/2) firm clay loam, structureless, common prominent medium mottles (10YR 7/8), many sand-sized carbonate clasts, common pieces of fragmented bedrock, lower boundary not observed. Late Holocene Ford alluvium, 2C horizon.

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**APPENDIX C: Analysis of Sediment Samples  
from Paluxy Site 41CV1258**

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and

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Sixteen sediment samples were collected from Backhoe Trenches 1 and 2 at site 41CV1258 and submitted to the Soils and Physical Geography Laboratory, University of Wisconsin at Milwaukee for textural and clay mineralogical analyses. Portions of three samples (Samples 7, 11, and 14) were submitted to National Petrographic Service, Inc., and impregnated with clear epoxy, thin sectioned, and subjected to a petrographic analysis by Hudgeons (Department of Geologic Sciences, The University of Texas at Austin). These analyses were conducted to provide a better understanding of the sediment supply, modes of sediment transport and deposition, postdepositional weathering, and the role of the parent material in the formation of Paluxy sites.

Samples 1–15 were subjected to textural analyses by hydrometer and sieve. Table 103 presents the percentages of gravel, sand, silt, and clay for each sample. The sand, silt, and clay percentages were obtained by hydrometer, and later adjusted to include the percentages of gravels (>2 mm), which were obtained by sieve analysis. Table 104 presents the percentages at  $\frac{1}{2}$ -phi intervals of the sand fraction of each sample. These percentages were obtained through sieve analysis. Standard deviations for each sample are also presented to determine the degree of sorting. New portions of four samples (Samples 6, 12, 14, and 16) were analyzed for clay minerals. These were run as oriented samples prepared by the glass slide method producing

air-dried and glycolated diffractograms for each sample, and smoothed diffractograms and tables of d-spacings for each run. Although the raw data are not presented here, it is interpreted that Samples 6, 12, and 16 contain mixtures of illite and kaolinite. Sample 16 also contains calcite, while no clays were detected in Sample 14.

Portions of three sediment samples—7, 11, and 14—were impregnated with a clear epoxy; thin sectioned; mounted; stained for calcite, iron rich carbonates, potassium feldspars, and plagioclase; and subjected to petrographic analysis. A total of nine slides, three for each sample, was produced. Each slide was examined under an Olympus BH-2 petrographic microscope and subjected to a 200-point count using a Swift Automatic Point Counter (Model E) and a 20X objective lens at 3-mm stage intervals. Images were taken in plane, polarized, and reflected light by a JVC TK-107OU Color Video Camera mounted on a Zeiss petrographic microscope using a 10X objective lens. The images were saved and imported into Adobe Photoshop where the brightness and contrast was adjusted (ca. -10 and +20, respectively) to improve image quality. The images were then printed using a Hewlett Packard Desk Jet 1200/PS Color Laser Printer.

The data are given in Table 105 as percentages of 200-point counts, after which the characteristics of the framework grains, matrix, cement, porosity, and other attributes of each sample are presented.

**Table 103. Textural analysis of Paluxy site sediment samples**

Sample	Gravel Percent	Sand Percent	Silt Percent	Clay Percent
1	0.0	65	16	19
2	0.0	70	13	17
3	0.0	63	17	20
4	0.0	68	14	18
5	0.3	77	8	15
6	0.0	74	6	20
7	0.4	68	10	22
8	0.0	56	17	27
9	3.1	73	8	16
10	0.4	61	12	26
11	0.0	79	7	14
12	0.0	60	7	33
13	0.0	62	11	27
14	0.0	95	1	4
15	0.0	97	1	2

Table 104. Subdivision of sand fraction

Sample	-0.5 $\phi$		-0.0 $\phi$		0.5 $\phi$		1.0 $\phi$		1.5 $\phi$		2.0 $\phi$		2.5 $\phi$		3.0 $\phi$		3.5 $\phi$		4.0 $\phi$		4.25 $\phi$		Mean		Standard Deviation
	Percent	Phi Size	Percent	Phi Size	Percent	Phi Size	Percent	Phi Size	Percent	Phi Size	Percent	Phi Size	Percent	Phi Size	Percent	Phi Size	Percent	Phi Size	Percent	Phi Size	Percent	Phi Size	Percent	Phi Size	
1	0.4		0.5		0.6		0.8		0.8		1.1		13.1		47.2		26.3		7.9		1.3		2.81		0.61
2	0.5		0.7		0.9		1.1		1.0		1.2		10.1		46.3		28.7		7.8		1.7		2.80		0.66
3	0.7		0.9		0.9		1.1		1.3		1.8		11.6		50.5		23.3		6.3		1.6		2.74		0.69
4	0.2		0.3		0.4		0.7		1.0		1.5		12.6		50.6		24.1		7.2		1.4		2.81		0.55
5	0.0		0.1		0.2		0.1		0.1		0.4		9.6		48.3		30.7		8.2		2.3		2.92		0.43
6	0.0		0.0		0.0		0.0		0.0		0.4		11.0		50.9		28.9		7.2		1.6		2.91		0.39
7	0.2		0.3		0.4		0.4		0.5		0.8		11.4		50.2		27.4		7.1		1.3		2.85		0.52
8	0.1		0.1		0.1		0.2		0.3		0.7		12.7		51.7		24.9		7.7		1.5		2.87		0.46
9	0.0		0.1		0.3		0.3		0.4		0.7		14.4		62.4		15.8		4.8		0.8		2.78		0.42
10	0.0		0.0		0.1		0.1		0.1		0.3		10.7		55.6		24.5		7.1		1.5		2.88		0.40
11	0.0		0.1		0.1		0.1		0.1		0.3		12.6		49.1		28.7		7.4		1.5		2.89		0.43
12	0.0		0.0		0.0		0.0		0.0		0.3		11.7		51.7		26.3		7.0		3.0		2.89		0.39
13	0.0		0.0		0.1		0.1		0.2		0.6		11.3		54.5		23.1		8.8		1.3		2.89		0.42
14	0.0		0.0		0.0		0.0		0.0		0.1		5.2		56.8		33.2		4.2		0.5		2.93		0.33
15	0.0		0.0		0.0		0.0		0.0		0.0		1.3		51.7		44.4		2.4		0.2		2.99		0.28

Table 105. Petrographic analysis of Paluxy site sediment samples

	Sample 7	Sample 11	Sample 14
Framework			
Monoquartz	42.2	51.7	58.9
Polyquartz	1.3	1.8	2.2
Feldspar	1.9	1.5	2.5
Rock fragments	1.0	1.3	1.7
Heavy minerals	0.7	0.8	0.8
Matrix			
Hematitic clay	39.0	28.7	0.0
Cement			
Calcite	0.5	0.2	1.5
Porosity	13.3	13.9	32.3

**SAMPLE 7****Framework Grains**

**Quartz:** The quartz grains consist of monoquartz and polyquartz. The monoquartz grains are primarily a first-cycle common quartz. The polyquartz grains primarily have 3 to 5 subgrains. The grains are subangular to subrounded and show no oriented alignment. Many of the grains have undergone slight dissolution.

**Feldspars:** The feldspars consist of grid-twinned (80 percent) and untwinned (20 percent) specimens. The grains have undergone slight dissolution along cleavage planes or fractures. No skeletal remnants are present.

**Rock fragments:** Rock fragments predominantly consist of sedimentary rock fragments. Most of these are clay clasts containing small quartz grains. The fact that they are not deformed is evidence of modest compaction. Other sedimentary rock fragments include pieces of carbonate rock and chert. The chert is both even-grained and uneven-grained ultra-microcrystalline quartz. Metamorphic rock fragments are less common and consist of quartz-mica schists.

**Miscellaneous:** Heavy minerals are rare and show little dissolution.

**Matrix**

**Hematitic clay:** Infiltrated hematitic clays coat all grains and fill most pore spaces.

**Cement**

**Quartz cement:** Very small amounts of quartz overgrowths are present, but these are probably reworked.

**Calcite cement:** Small amounts of calcite cement exist in patches of small crystals.

**Porosity**

The volume of pore space was much higher before the infiltration of the hematitic clay. Intergranular pores account for seven percent of the pores observed. Two percent are oversize pores produced by grain dissolution and bioturbation, two percent are intragranular pores and are primarily in the sedimentary rock fragments, and three percent are micropores within the hematitic clay. All oversize and intragranular pores appear to be secondary, while some of the intergranular pores also may be secondary.

**Bedding:** Structureless.

**Fabric:** The orientation of the quartz and feldspar grains is random. There is no evidence of slumping; however, there is slight evidence of bioturbation resulting in a small amount of secondary porosity. Packing is modest and even. There is a hint of pressure solution only at rare grain contacts. The infiltration of hematitic clays is pervasive throughout the sample, filling pore spaces and creating its own microporosity.

**Texture:** Sample 7 consists of moderately sorted medium-grained sandstone. Quartz grains

are subangular to subrounded.

### **Provenience**

The majority of the detritus was derived from a chert- and clay-bearing sedimentary source. Minor amounts of low-grade metamorphic rocks are also present.

### **Environment of Deposition**

There are no clues to the environment of deposition in this sample.

### **Diagenetic Sequence**

**Diagenetic sequence:** Mechanical compaction, calcite cement, quartz cement (pressure solution as local source of silica), slight grain dissolution, and infiltration of hematitic clay.

## **SAMPLE 11**

### **Framework Grains**

**Quartz:** The quartz grains consist of monoquartz and polyquartz. The monoquartz grains are primarily a second-cycle common quartz. The grains are subangular to subrounded and show no oriented alignment. Polyquartz grains primarily have three or more subgrains. Many grains have undergone slight dissolution and bear reworked quartz overgrowths.

**Feldspar:** The feldspars consist of grid-twinned (80 percent) and untwinned (20 percent) specimens. Most grains have undergone slight dissolution along cleavage planes or fractures. These secondary pores have been filled by hematitic clays. No skeletal remnants are present.

**Rock fragments:** Sedimentary rock fragments consist of a few clay clasts, pieces of carbonate rock, and chert, but they are fewer in number compared to Sample 7. The chert is both even-grained and uneven-grained ultramicrocrystalline quartz. A noticeably greater amount of metamorphic rock fragments is present in Sample 11. Most are low-grade quartz-mica schists. Some elongated biotite, which has undergone minimal deformation, is present. It has been attacked by an unknown agent and is largely dissolved.

**Miscellaneous:** Heavy minerals show little dissolution, but are rare, as are plant fragments.

### **Matrix**

**Hematitic clay:** Unfiltered hematitic clay is pervasive, coating all grains and filling pore spaces.

### **Cement**

**Quartz cement:** Almost all of the quartz grains have reworked quartz overgrowths.

**Calcite cement:** Small amounts of calcite cement exist in patches of small crystals.

### **Porosity**

The volume of pore space was much higher before the infiltration of the hematitic clays. Intergranular pores account for eight percent of the pore space. Two percent are oversize pores from grain dissolution and bioturbation, one percent are intragranular pores primarily in the sedimentary rock fragments, and three percent are micropores within the hematitic clays. All oversize and intragranular pores appear to be secondary, as do some of the intergranular pores.

### **Bedding: Structureless**

**Fabric:** Quartz, feldspar, and rock fragments are randomly oriented. There is no evidence of slumping. There is also slight evidence of bioturbation, creating a small amount of secondary porosity. Packing is modest and even, although it is slightly tighter than Sample 7. There is a hint of pressure solution only at rare grain contacts. Unfiltered hematitic clays are pervasive throughout the sample, filling pore spaces and creating its own microporosity.

**Texture:** Sample 11 consisted of moderately sorted, medium-grained sandstone. Quartz grains are subangular to subrounded.

### **Provenience**

The majority of the detritus was derived from a clay-bearing sedimentary source, and a significant amount from low-grade metamorphic rocks.

### **Environment of Deposition**

There are no clues to environment of deposition in this sample.

### Diagenetic Sequence

**Diagenetic sequence:** Mechanical compaction, quartz cement, calcite cement, grain dissolution, and hematitic clay.

#### SAMPLE 14

### Framework Grains

**Quartz:** The monoquartz is a first-cycle common quartz. The polyquartz grains primarily have more than three subgrains. Neither the monoquartz nor polyquartz grains have undergone much dissolution.

**Feldspar:** The feldspars are mostly untwinned. The grains have undergone little dissolution. No apparent skeletal remnants are present.

**Rock fragments:** Rock fragments are sedimentary. Many of the sedimentary rock fragments are chert bearing. The chert is both even-grained and uneven-grained ultramicrocrystalline quartz.

**Miscellaneous:** Heavy minerals are rare. No micas are present.

### Matrix

There is no clay or matrix in this sample.

### Cement

**Quartz cement:** There are hints of slight quartz overgrowths, possibly reworked.

**Calcite cement:** Cements consist of patchy microspar and fascicular optic calcite. The

cement is widely distributed and patchy, and has undergone considerable dissolution. It has preserved some porosity, indicating it developed during compaction.

### Porosity

Regular intergranular pores account for 25 percent of the pores. Three percent are oversize pores, and two percent are intragranular pores.

**Bedding:** Structureless.

**Fabric:** Subrounded quartz, feldspar, and rock fragments are randomly oriented. There is no evidence of bioturbation or slumping. Uneven packing resulted from a patchy calcite cementation during compaction. Packing is moderate with areas of pressure solution at grain contacts.

**Texture:** Well-sorted, medium-grained sandstone.

### Provenience

Most of the detritus was derived from chert-bearing sedimentary rocks.

### Environment of Deposition

There are no clues to environment of deposition in this sample.

### Diagenetic Sequence

**Diagenetic sequence:** Mechanical compaction, calcite cement, further compaction, grain dissolution (pressure solution), quartz cementation, and calcite cement dissolution.

**APPENDIX D: Analysis of Vertebrate  
Faunal Remains**

Barry W. Baker



## INTRODUCTION

This appendix presents results of an analysis of vertebrate faunal remains ( $n = 1,008$ ) recovered from archeological investigations at nine prehistoric open campsites in Coryell County: 41CV578, 41CV988, 41CV1049, 41CV1122, 41CV1133, 41CV1191, 41CV1235, 41CV1250, and 41CV1269. Sites 41CV988, 41CV1049, and 41CV1191 are situated on the Paluxy sand formation, sites 41CV1122 and 41CV1133 are located near Table Rock Creek, and the rest of the sites are situated along House Creek.

## PREVIOUS FAUNAL INVESTIGATIONS

Previous investigations of Fort Hood archeofaunas include studies by Baker (1995, 1999), Neck (1993), Sanchez (1993), Sanchez and Shaffer (1993a, 1993b), and Shaffer (1995). Amino acid racemization studies of archeological land snails (*Rabdotus*) from Fort Hood have been reported by Abbott et al. (1995), Ellis (1994), Ellis and Goodfriend (1994), and Ellis et al. (1996). In addition, Baker (1993, 1994:29–57) and Black (1989:33–34) summarized general prehistoric subsistence data for Central Texas.

## METHODS

Faunal remains were collected in the field with ¼-inch screens and from flotation samples. Bones and teeth were identified in conjunction with comparative skeletal material as precisely as possible based on morphological features and regional biogeography of animal species. The following identification guides were consulted: Balkwill and Cumbaa (1992), Brown and Gustafson (1989), Gilbert (1980), Lawrence (1951), Olsen (1960, 1968), and Schmid (1972).

Specimens were coded using a modified version of Shaffer and Baker (1992). Data were manipulated in dBase (III+) following Carlson and Shaffer (1992) and exported into Microsoft Excel for table construction. The following information was recorded for each specimen where applicable: site, accession number, quantity, taxon, element, portion of element, side, weathering, breakage pattern, burning, and pitting. Additional observations including age, age criteria, gnawing, and other taphonomic observations, were recorded in the Comments

field. Specimens broken in dry bone fractures that could be refitted were coded as one specimen. Individual teeth retained within an alveolus were coded separately.

Specimens identifiable to class but not to a more specific taxon were assigned to general body size classes where possible. Definitions of the size categories are small mammal (rabbit sized or smaller), small rodent (mouse sized), medium-sized rodent (rat/gopher sized), medium-sized cricetid (rat-sized Cricetid), medium-sized mammal (larger than jackrabbit to canid sized), medium to large-sized mammal (canid to deer sized), and very large mammal (cow sized).

## RESULTS AND DISCUSSION

Data resulting from the faunal analysis are summarized in Tables 106–108. Given the relatively small sample sizes, a detailed site by site or comparative analysis was not undertaken. The focus of this section is a descriptive presentation of the faunal remains in conjunction with taphonomic observations.

### Taxa Representation

Roughly 14 percent ( $n = 144$ ) of the total sample ( $n = 1,008$ ) was identified to order, family, genus, or species. At least eight species are represented in the assemblage (see Table 106), including *Anura* (frog/toad) (0.10 percent,  $n = 1$ ), *Sylvilagus* sp. (cottontail rabbit) (0.69 percent,  $n = 7$ ), small rodent (mouse sized) (0.10 percent,  $n = 1$ ), medium-sized Cricetid rodent (rat sized) (0.10 percent,  $n = 1$ ), carnivore (0.10 percent,  $n = 1$ ), cf. *Sus scrofa* (pig) (0.10 percent,  $n = 1$ ), *Odocoileus* sp. (deer) (2.08 percent,  $n = 21$ ), and *Bison* sp. (bison) (0.10 percent,  $n = 1$ ). Unidentified fragments dominate the sample (66.67 percent,  $n = 672$ ), followed by mammals (33.23 percent,  $n = 335$ ) and amphibians (0.10 percent,  $n = 1$ ), respectively. These taxa generally represent forest and forest-edge habitats, but the bison reflects a grassland setting.

Interestingly, no species diagnostic of a riverine environment were identified, despite the fact that the sites are situated along perennial streams, and riparian taxa (such as frogs, toads, mud turtles, and beavers) are commonly identified in other Fort Hood faunal assemblages (Baker 1997, 1999; Neck 1993; Sanchez 1993;

Table 106. Taxa recovered from selected sites at Fort Hood, Texas

Site	Analysis Unit	Taxon	Common Name	Totals
41CV578	2	Vertebrata	Vertebrates	5
41CV988	1	Vertebrata	Vertebrates	6
	1	cf. <i>Sus scrofa</i>	Pig	1
Subtotal				7
41CV1049	1	Vertebrata	Vertebrates	1
41CV1122	1	Vertebrata	Vertebrates	12
	1	Mammalia (Medium/large)	Medium/large mammal	1
	1	Mammalia (Large)	Large mammal	1
	1	<i>Odocoileus</i> sp.	Deer	1
	2	Vertebrata	Vertebrates	49
	2	Mammalia (Medium/large)	Medium/large mammal	42
	2	Mammalia (Large)	Large mammal	7
	2	Leporidae	Rabbits and hares	1
	2	Carnivora	Carnivores	1
Subtotal				115
41CV1133	1	Vertebrata	Vertebrates	1
	1	Small/Medium Vertebrata	Small/medium-sized vertebrate	1
Subtotal				2
41CV1191	1	Vertebrata	Vertebrates	9
41CV1235	1	Vertebrata	Vertebrates	212
	1	Small/Medium Vertebrata	Small/medium-sized vertebrate	16
	1	Mammalia (Small)	Small mammal	5
	1	Mammalia (Medium)	Medium-sized mammal	1
	1	Mammalia (Medium/large)	Medium/large mammal	50
	1	Mammalia (Large)	Large mammal	11
	1	Leporidae	Rabbits and hares	1
	1	<i>Sylvilagus</i> sp.	Cottontail rabbits	3
	1	Rodentia (Small)	Small rodent	1
	1	<i>Odocoileus</i> sp.	Deer	9
	1	cf. <i>Odocoileus</i> sp.	Deer	1
	1	<i>Antilocapra/Odocoileus</i>	Pronghorn/deer	8
	2	Vertebrata	Vertebrates	155
	2	Small/Medium Vertebrata	Small/medium-sized vertebrate	17
	2	Medium/Large Vertebrata	Medium/large vertebrate	2
	2	Mammalia (Medium/large)	Medium/large mammal	49
	2	Mammalia (Large)	Large mammal	6
	2	<i>Odocoileus</i> sp.	Deer	3
	2	<i>Antilocapra/Odocoileus</i>	Pronghorn/deer	4
Subtotal				554
41CV1250	1	Vertebrata	Vertebrates	16
	1	Medium/Large Vertebrata	Medium/large vertebrate	2
	1	Anura	Toads and frogs	1
	1	Mammalia (Medium/large)	Medium/large mammal	16
	1	Mammalia (Large)	Large mammal	3
	1	<i>Sylvilagus</i> sp.	Cottontail rabbits	3
	1	Cricetidae (Medium)	Medium cricetid rodent	1
	1	<i>Odocoileus</i> sp.	Deer	1
	1	cf. <i>Antilocapra/Odocoileus</i>	Pronghorn/deer	1
	2	Vertebrata	Vertebrates	3
	2	Small/Medium Vertebrata	Small/medium-sized vertebrate	4
	2	Mammalia (Medium/large)	Medium/large mammal	5
	2	Mammalia (Large)	Large mammal	4
	2	<i>Odocoileus</i> sp.	Deer	1
Subtotal				61

Table 106, continued

Site	Analysis Unit	Taxon	Common Name	Total
41CV1269	1	Vertebrata	Vertebrates	1
	1	Mammalia (Medium/large)	Medium/large mammal	4
	1	Mammalia (Large)	Large mammal	1
	1	Mammalia (Very large)	Very large mammal	1
	1	cf. <i>Antilocapra/Odocoileus</i>	Pronghorn/deer	1
	2	Vertebrata	Vertebrates	73
	2	Small/Medium Vertebrata	Small/medium-sized vertebrate	16
	2	Mammalia (Medium/Large)	Medium/large mammal	46
	2	Mammalia (Large)	Large mammal	18
	2	Leporidae	Rabbits and hares	1
	2	<i>Sylvilagus</i> sp.	Cottontail rabbits	1
	2	Rodentia (Small/Medium)	Small/medium-sized rodent	1
	2	<i>Odocoileus</i> sp.	Deer	6
	2	<i>Bison</i> sp.	Bison	1
	3	Vertebrata	Vertebrates	70
	3	Small/Medium Vertebrata	Small/medium-sized vertebrate	1
	3	Mammalia (Medium/Large)	Medium/large mammal	10
	3	Artiodactyla	Even-toed ungulates	2
Subtotal				254
Sample Total				1,008

Sanchez and Shaffer 1993a, 1993b; Shaffer 1995).

Notable taxa include (1) an indeterminate frog/toad from 41CV1250B; (2) a subadult metapodial fragment that compares favorably with pig, from 41CV988; and (3) a bison identified from a complete left fused central/fourth tarsal from 41CV1269. The specimen was identified as bison rather than cow based on morphological criteria described and illustrated by Balkwill and Cumbaa (1992).

### Taphonomy

Taphonomy is the study of processes that modify and redistribute animal remains from the time the animal dies until the remains are collected for study (Efremov 1940; Lyman 1994). Given the relatively small sizes of the Fort Hood samples, an extensive taphonomic study was not undertaken, though a few observations are warranted (see Table 107).

### Bone Breakage

This sample is highly fragmented. Of the 1,008 specimens analyzed, only 10 (1 percent) were complete. This high degree of fragmentation is typical of hunter-gatherer sites for the area. The majority of these breaks are dry bone fractures ( $n = 730$ , 72.42 percent), meaning that

the breaks occurred long after the bone lost the majority of its collagen. These breaks are commonly associated with postdepositional forces acting on the assemblage.

Early on in taphonomy studies, it was believed that spirally fractured bone could result only from human behavior. Broader actualistic studies later showed that spiral fractures can result from a range of activities, including those of humans, carnivores, and animal trampling (Binford 1981; Lyman 1994). The presence of a spiral fracture, then, shows only that the bone was broken while it retained a relatively high degree of collagen (Johnson 1985). Human consumers typically break bones to extract their marrow and grease, or to use the bone itself as a raw material source for tools or ornaments.

Over 26 percent ( $n = 268$ ) of the total sample is spirally fractured (see Table 107). Site 41CV1250 shows the highest frequency of spirally fractured bone, at 39.34 percent ( $n = 24$ ). Interestingly, this site yielded a low frequency of burned bones. It is possible that both human and nonhuman forces contributed to the spiral fractures in the assemblage, though no definite carnivore damage was noted.

### Burned Bone

In the past, burned bone was interpreted,

Table 107. Taphonomic data

Site	Analysis Unit	Sample Size	Lightly Weathered		Spirally Fractured		Burned		Rodent Gnawed		Pitted	
			N	%	N	%	N	%	N	%	N	%
41CV578	2	5	-	-	-	-	-	-	-	-	5	100
41CV988	1	7	-	-	-	-	1	14	-	-	-	-
41CV1049	1	1	-	-	-	-	-	-	-	-	1	100
41CV1122	1	15	-	-	4	27	3	20	-	-	8	53
41CV1122	2	100	6	6	7	7	9	9	-	-	54	54
41CV1133	1	2	-	-	1	50	-	-	-	-	1	50
41CV1191	1	9	-	-	-	-	-	-	-	-	9	100
41CV1235	1	318	11	4	85	27	61	19	1	0	185	58
41CV1235	2	236	8	3	68	29	49	21	-	-	130	55
41CV1250	1	44	4	9	14	32	4	9	1	2	6	14
41CV1250	2	17	-	-	10	59	-	-	-	-	13	77
41CV1269	1	8	-	-	7	88	1	13	-	-	4	50
41CV1269	2	163	31	19	58	36	49	30	-	-	21	13
41CV1269	3	83	-	-	14	17	33	40	-	-	44	53
Totals		1,008	60	6	268	27	210	21	2	0	481	48

Table 108. Vertebrate faunas recovered from the Fort Hood sites by accession number

Site	Acen	Taxon	Element	Portion of Element	Side	Comments	Totals
41CV578	50	Vertebrata	Indeterminate	Fragment			1
	52	Vertebrata	Indeterminate	Fragment			4
Subtotal							5
41CV988	16	Vertebrata	Indeterminate	Fragment			2
	33	Vertebrata	Indeterminate	Fragment			4
	33	cf. <i>Sus scrofa</i>	Metapodial	Distal articular condyle		Subadult; epiphysis unfused	1
Subtotal							7
41CV1049	22	Vertebrata	Indeterminate	Fragment			1
41CV1122	18	Vertebrata	Indeterminate	Fragment			1
	19	Vertebrata	Indeterminate	Fragment			1
	20	Vertebrata	Indeterminate	Fragment			5
	20	Mammalia (Medium/Large)	Indeterminate	Fragment			1
	21	Vertebrata	Indeterminate	Fragment			2
	23	Vertebrata	Indeterminate	Fragment			1
	24	Leporidae	Third tarsal	Complete or nearly complete			1
	28	Mammalia (Medium/Large)	Indeterminate	Fragment	right		2
	29	Mammalia (Medium/Large)	Tooth, perm./decid. ind.	Root fragment			1
	31	Vertebrata	Indeterminate	Fragment			1
	31	Mammalia (Large)	Indeterminate	Fragment			1
	32	Vertebrata	Indeterminate	Fragment			1
	32	Mammalia (Medium/Large)	Indeterminate	Fragment		Encrusted	20
	32	Mammalia (Large)	Indeterminate	Fragment			21
	32	Mammalia (Large)	Indeterminate	Fragment			1
	32	Mammalia (Large)	Long bone	Diaphyseal fragment		Encrusted	2
	32	Carnivora	Permanent tooth	Canine		Encrusted	1
	33	Vertebrata	Indeterminate	Fragment		Encrusted	1
	33	Mammalia (Medium/Large)	Indeterminate	Fragment		Encrusted	25
	33	Mammalia (Medium/Large)	Long bone	Diaphyseal fragment			12
	33	Mammalia (Large)	Indeterminate	Fragment			5
	34	Vertebrata	Indeterminate	Fragment			1
	34	Mammalia (Medium/Large)	Long bone	Diaphyseal fragment			2
	39	Vertebrata	Indeterminate	Fragment			1
	39	<i>Odocoileus</i> sp.	Permanent tooth	Upper PM3			1
	49	Vertebrata	Indeterminate	Fragment	Left	Adult; moderate wear	1
	49	Mammalia (Large)	Indeterminate	Fragment			2
	62	Vertebrata	Indeterminate	Fragment			1
	64	Mammalia (Large)	Tooth, perm./decid. ind.	Root fragment			1
Subtotal							115
41CV1133	36	Small/Medium Vertebrata	Long bone	Diaphyseal fragment			1
	57	Vertebrata	Indeterminate	Fragment			1
Subtotal							2

Table 108, continued

Site	Accn	Taxon	Element	Portion of Element	Side	Comments	Totals
41CV1191	28	Vertebrata	Indeterminate	Fragment			9
41CV1235	100	Vertebrata	Indeterminate	Fragment			1
	100	Mammalia (Medium/Large)	Mandible	Alveolar ridge fragment			1
	103	Mammalia (Large)	Long bone	Diaphyseal fragment			7
	103	<i>Antilocapra/Odocoileus</i>	Metapodial	Distal end			1
	107	Vertebrata	Indeterminate	Fragment			1
	107	Mammalia (Medium)	Metapodial	Distal end			1
	107	cf. <i>Odocoileus</i> sp.	Tooth, perm./decid. ind.	Enamel fragment			1
	109	<i>Sylvilagus</i> sp.	Humerus	Distal end	Left		1
	112	Vertebrata	Indeterminate	Fragment			4
	112	Small/Medium Vertebrata	Long bone	Diaphyseal fragment			1
	112	Mammalia (Medium/Large)	Long bone	Diaphyseal fragment			1
	112	Rodentia (Small)	Tibia	Distal end	Left		1
	113	Vertebrata	Indeterminate	Fragment			2
	113	Small/Medium Vertebrata	Long bone	Diaphyseal fragment			2
	114	Vertebrata	Indeterminate	Fragment			9
	114	Mammalia (Small)	Femur	Complete distal epiphysis			1
	114	Leporidae	Permanent tooth	Upper cheek tooth			1
	116	Vertebrata	Indeterminate	Fragment			9
	116	Small/Medium Vertebrata	Long bone	Diaphyseal fragment			4
	117	Vertebrata	Indeterminate	Fragment			7
	117	Small/Medium Vertebrata	Long bone	Diaphyseal fragment			3
	118	Vertebrata	Indeterminate	Fragment			3
	119	Vertebrata	Indeterminate	Fragment			2
	119	Mammalia (Medium/Large)	Indeterminate	Fragment			2
	119	Mammalia (Medium/Large)	Permanent tooth	Upper cheek tooth			1
	120	<i>Sylvilagus</i> sp.	Indeterminate	Fragment			12
	120	Vertebrata	Indeterminate	Fragment			1
	120	Mammalia (Medium/Large)	Indeterminate	Fragment			1
	121	Vertebrata	Indeterminate	Fragment			24
	121	Mammalia (Medium/Large)	Indeterminate	Fragment			6
	121	Mammalia (Medium/Large)	Indeterminate	Petrosal			1
	121	Mammalia (Medium/Large)	Cranium	Fragment			1
	121	Mammalia (Medium/Large)	Alveolar ridge fragment	Diaphyseal fragment			2
	121	Mammalia (Large)	Long bone	Cheek tooth			2
	121	<i>Odocoileus</i> sp.	Tooth, perm./decid. ind.	Fragment			1
	38	Vertebrata	Indeterminate	Fragment			1
	39	Small/Medium Vertebrata	Long bone	Diaphyseal fragment			2
	41	Vertebrata	Indeterminate	Fragment			3
	41	Small/Medium Vertebrata	Long bone	Diaphyseal fragment			1
	41	Mammalia (Medium/Large)	Indeterminate	Fragment			1
	41	Mammalia (Medium/Large)	Long bone	Diaphyseal fragment			1

Table 108, continued

Site	Accn	Taxon	Element	Portion of Element	Side	Comments	Totals
41CV1235, continued	42	Vertebrata	Indeterminate	Fragment			29
	42	Small/Medium Vertebrata	Long bone	Diaphyseal fragment			2
	42	Mammalia (Medium/Large)	Indeterminate	Fragment			9
	42	Mammalia (Medium/Large)	Long bone	Diaphyseal fragment			1
	43	Vertebrata	Indeterminate	Fragment			38
	43	Small/Medium Vertebrata	Long bone	Diaphyseal fragment			5
	43	Mammalia (Medium/Large)	Indeterminate	Fragment			2
	43	Mammalia (Medium/Large)	Long bone	Diaphyseal fragment			1
	44	Vertebrata	Indeterminate	Fragment			4
	44	Small/Medium Vertebrata	Long bone	Diaphyseal fragment			1
	44	Mammalia (Medium/Large)	Indeterminate	Fragment			4
	44	<i>Odocoileus</i> sp.	Distal phalange	Proximal end			1
	45	Vertebrata	Indeterminate	Fragment		Encrusted	1
	45	Mammalia (Medium/Large)	Indeterminate	Fragment			2
	47	Vertebrata	Indeterminate	Fragment			4
	47	Small/Medium Vertebrata	Long bone	Diaphyseal fragment			2
	47	Mammalia (Medium/Large)	Indeterminate	Fragment			1
	47	<i>Antilocapra/Odocoileus</i>	Phalange	Fragment			1
	53	Vertebrata	Indeterminate	Fragment			3
	53	Medium/Large Vertebrata	Long bone	Diaphyseal fragment			2
	53	Mammalia (Medium/Large)	Indeterminate	Fragment			6
	53	Mammalia (Large)	Indeterminate	Fragment			1
	55	Vertebrata	Indeterminate	Fragment			1
	58	Vertebrata	Indeterminate	Fragment			7
	59	<i>Odocoileus</i> sp.	Mandible	Horizontal ramus portion	right		1
	59	<i>Odocoileus</i> sp.	Permanent tooth	Lower M3	right		1
	60	Vertebrata	Indeterminate	Fragment			16
	60	Mammalia (Small)	Radius	Proximal end	right		1
	60	Mammalia (Medium/Large)	Indeterminate	Fragment			3
	60	Mammalia (Medium/Large)	Tooth, perm./decid. ind.	Enamel fragment			1
	61	<i>Odocoileus</i> sp.	Fused 3rd & 4th metacarpal	Proximal anterior end	left		1
	61	Vertebrata	Indeterminate	Fragment			3
	62	<i>Sylvilagus</i> sp.	Humerus	Distal end	left		1
	62	Vertebrata	Indeterminate	Fragment			35
	62	Small/Medium Vertebrata	Long bone	Diaphyseal fragment			9
	62	Mammalia (Medium/Large)	Indeterminate	Fragment			4
	64	Vertebrata	Indeterminate	Fragment			34
	64	Mammalia (Medium/Large)	Indeterminate	Fragment			3
	64	Mammalia (Medium/Large)	Long bone	Diaphyseal fragment			8
	64	Medium (Large)	Vertebra	Articular facet	axial		1
	64	Medium (Large)	Long bone	Diaphyseal fragment			1

Table 108, continued

Site	Accn	Taxon	Element	Portion of Element	Side	Comments	Totals
41CV1235,	64	<i>Odocoileus</i> sp.	Calcaneus	Complete or nearly complete			1
continued	64	<i>Antilocapra/Odocoileus</i>	Metapodial	Distal articular condyle	left	Subadult; epiphysis unfused	2
	66	Vertebrata	Indeterminate	Fragment			16
	66	Mammalia (Medium/Large)	Indeterminate	Fragment			4
	66	Mammalia (Medium/Large)	Long bone	Diaphyseal fragment			3
	68	Vertebrata	Indeterminate	Fragment			8
	68	Mammalia (Large)	Long bone	Diaphyseal fragment			2
	70	Mammalia (Medium/Large)	Indeterminate	Fragment			10
	70	Mammalia (Large)	Long bone	Diaphyseal fragment			1
	70	<i>Odocoileus</i> sp.	Tibia	Diaphyseal fragment			1
	70	<i>Antilocapra/Odocoileus</i>	Metapodial	Distal articular condyle	left		1
	86	Vertebrata	Indeterminate	Fragment			13
	86	Mammalia (Small)	Long bone	Diaphyseal fragment			3
	86	Mammalia (Medium/Large)	Indeterminate	Fragment			3
	86	Mammalia (Large)	Femur	Complete proximal epiphysis		Subadult; epiphysis unfused	1
	87	Vertebrata	Indeterminate	Fragment			46
	87	Vertebrata	Indeterminate	Fragment		Rodent gnawed	1
	87	Small/Medium Vertebrata	Long bone	Diaphyseal fragment			1
	87	Mammalia (Medium/Large)	Indeterminate	Fragment			2
	87	Mammalia (Medium/Large)	Long bone	Diaphyseal fragment			3
	87	Mammalia (Large)	Long bone	Diaphyseal fragment			1
	87	<i>Antilocapra/Odocoileus</i>	Metapodial	Distal articular condyle			2
	87	<i>Antilocapra/Odocoileus</i>	Fused 3rd & 4th metatarsal	Anterior portion of shaft		Subadult; epiphysis unfused	1
	87	<i>Antilocapra/Odocoileus</i>	Fused 2nd & 3rd tarsal	Complete or nearly complete			1
	87	<i>Antilocapra/Odocoileus</i>	Astragalus	Complete or nearly complete	right		1
	88	Vertebrata	Indeterminate	Fragment	left		1
	95	Vertebrata	Indeterminate	Fragment			1
	95	Mammalia (Medium/Large)	Indeterminate	Fragment			2
	96	Vertebrata	Indeterminate	Fragment			2
	96	Mammalia (Medium/Large)	Indeterminate	Fragment			9
	96	Mammalia (Medium/Large)	Indeterminate	Fragment			4
	96	Mammalia (Medium/Large)	Alveolar ridge fragment	Fragment			2
	96	<i>Odocoileus</i> sp.	Permanent tooth	Lower PM4			1
	96	<i>Odocoileus</i> sp.	Tooth, perm./decid. ind.	Cheek tooth	right		1
	96	<i>Antilocapra/Odocoileus</i>	Radius	Proximal lateral end			1
	97	Vertebrata	Indeterminate	Fragment	right		16
	97	Mammalia (Medium/Large)	Indeterminate	Fragment			5
	97	Mammalia (Medium/Large)	Alveolar ridge fragment	Fragment			1
	97	<i>Odocoileus</i> sp.	Permanent tooth	Upper PM			1
	97	<i>Odocoileus</i> sp.	Fused 3rd & 4th metacarpal	Distal end			1
	97	<i>Antilocapra/Odocoileus</i>	Proximal phalange	Distal end			1
	98	<i>Odocoileus</i> sp.	Calcaneus	Complete or nearly complete	left		1
	99	Vertebrata	Indeterminate	Fragment			2
Subtotal							554



Table 108, continued

Site	Acqn	Taxon	Element	Portion of Element	Side	Comments	Totals
41CV1250	11	Vertebrata	Indeterminate	Fragment			3
	11	Anura	Pelvis	Ilium fragment			1
	11	Mammalia (Medium/Large)	Indeterminate	Fragment			4
	11	Mammalia (Medium/Large)	Long bone	Diaphyseal fragment			1
	11	<i>Sylvilagus</i> sp.	Mandible	Incisor and diastema area only	right		1
	11	<i>Sylvilagus</i> sp.	Permanent tooth	Lower I	right		1
	11	<i>Sylvilagus</i> sp.	Permanent tooth	Lower PM3	right		1
	11	<i>Odocoileus</i> sp.	Permanent tooth	Tooth fragment			1
	11	<i>Odocoileus</i> sp.	Indeterminate	Fragment			7
	13	Vertebrata	Indeterminate	Fragment			4
	13	Mammalia (Medium/Large)	Indeterminate	Centrum		Subadult; epiphysis unfused	1
	13	Mammalia (Medium/Large)	Vertebra	Distal end	axial		1
	13	Cricetidae (Medium)	Tibia	Diaphyseal fragment	right		1
	13	cf. <i>Antilocapra/Odocoileus</i>	Femur	Fragment	left		4
	14	Small/Medium Vertebrata	Indeterminate	Proximal anterior end			1
	14	<i>Odocoileus</i> sp.	Fused 3rd & 4th metacarpal	Fragment	left		3
	15	Vertebrata	Indeterminate	Fragment			5
	15	Mammalia (Medium/Large)	Indeterminate	Prox. post. portion of shaft			1
	15	Mammalia (Large)	Femur	Diaphyseal fragment	right		1
	15	Mammalia (Large)	Long bone	Diaphyseal fragment			1
	19	Mammalia (Large)	Long bone	Diaphyseal fragment			1
	21	Mammalia (Large)	Long bone	Diaphyseal fragment			1
	24	Vertebrata	Indeterminate	Fragment			1
	25	Mammalia (Medium/Large)	Indeterminate	Fragment			6
	6	Mammalia (Large)	Indeterminate	Fragment		Rodent gnawed	1
	7	Vertebrata	Indeterminate	Fragment			5
	7	Medium/Large Vertebrata	Indeterminate	Fragment		Stained	1
	7	Medium/Large Vertebrata	Long bone	Diaphyseal fragment			1
	7	Mammalia (Large)	Long bone	Diaphyseal fragment		Stained	2
Subtotal							61
41CV1269	100	Vertebrata	Indeterminate	Fragment			8
	100	Small/Medium Vertebrata	Long bone	Diaphyseal fragment			2
	100	Mammalia (Medium/Large)	Indeterminate	Fragment			5
	100	Mammalia (Medium/Large)	Cranium	Fragment			1
	100	Mammalia (Medium/Large)	Alveolar ridge fragment	Alveolar ridge fragment			2
	100	Mammalia (Medium/Large)	Long bone	Diaphyseal fragment			2
	101	Vertebrata	Indeterminate	Fragment			2
	101	Small/Medium Vertebrata	Long bone	Diaphyseal fragment			1
	101	Mammalia (Medium/Large)	Indeterminate	Fragment			1
	101	<i>Sylvilagus</i> sp.	Calcaneus	Complete or nearly complete	right		1
	107	Vertebrata	Indeterminate	Fragment			8
	107	Mammalia (Medium/Large)	Indeterminate	Fragment			10
	107	<i>Odocoileus</i> sp.	Humerus	Distal end	right	Encrusted	1

Table 108, continued

Site	Accn	Taxon	Element	Portion of Element	Side	Comments	Totals
41CV1269, continued	108	Vertebrata	Indeterminate	Fragment			2
	109	Vertebrata	Indeterminate	Fragment			1
	111	Leporidae	Permanent tooth	Upper cheek tooth			1
	114	Vertebrata	Indeterminate	Fragment			2
	114	Rodentia (Small/Medium)	Tibia	Complete or nearly complete	left	Encrusted; subadult; epiphysis unfused	1
	53	Vertebrata	Indeterminate	Fragment			1
	53	Mammalia (Medium/Large)	Indeterminate	Fragment			1
	53	Mammalia (Very Large)	Long bone	Diaphyseal fragment			1
	57	Mammalia (Large)	Indeterminate	Fragment			1
	58	Mammalia (Medium/Large)	Indeterminate	Fragment			1
	58	cf. <i>Antilocapra/Odocoileus</i>	Metapodial	Proximal portion of shaft			3
	59	Vertebrata	Indeterminate	Fragment			1
	59	Mammalia (Medium/Large)	Indeterminate	Fragment			6
	59	Mammalia (Medium/Large)	Long bone	Diaphyseal fragment			7
	60	Vertebrata	Indeterminate	Fragment			1
	61	Vertebrata	Indeterminate	Fragment			1
	61	<i>Bison</i> sp.	Fused central/fourth tarsal	Complete or nearly complete	left		1
	62	Vertebrata	Indeterminate	Fragment			1
	62	Mammalia (Medium/Large)	Indeterminate	Fragment			2
	65	Vertebrata	Indeterminate	Fragment			1
	71	Mammalia (Medium/Large)	Indeterminate	Fragment			1
	72	Vertebrata	Indeterminate	Fragment			1
	72	Mammalia (Medium/Large)	Indeterminate	Fragment			9
	72	Mammalia (Large)	Long bone	Diaphyseal fragment			6
	72	<i>Odocoileus</i> sp.	Mandible	Horizontal ramus portion	left		4
	72	<i>Odocoileus</i> sp.	Permanent tooth	Lower PM4	left	Encrusted; adult; marked wear	1
	72	<i>Odocoileus</i> sp.	Permanent tooth	Lower M1	left	Encrusted; adult; marked wear	1
	72	<i>Odocoileus</i> sp.	Permanent tooth	Lower M2	left	Encrusted; adult; marked wear	1
	73	Vertebrata	Indeterminate	Fragment		Encrusted; adult; marked wear	6
	73	Mammalia (Medium/Large)	Indeterminate	Fragment			2
	73	Mammalia (Medium/Large)	Pelvis	Fragment		Encrusted	1
	73	Mammalia (Large)	Long bone	Diaphyseal fragment		Encrusted	2
	73	Mammalia (Large)	Long bone	Diaphyseal fragment			5
	73	<i>Odocoileus</i> sp.	Femur	Proximal end	left	Encrusted	1
	95	Vertebrata	Indeterminate	Fragment		Encrusted	2
	96	Vertebrata	Indeterminate	Fragment			1
	97	Vertebrata	Indeterminate	Fragment			3
	97	Small/Medium Vertebrata	Long bone	Diaphyseal fragment			1
	97	Mammalia (Medium/Large)	Indeterminate	Fragment			1
	98	Vertebrata	Long bone	Diaphyseal fragment			19
	98	Small/Medium Vertebrata	Long bone	Fragment			12
	98	Mammalia (Medium/Large)	Indeterminate	Fragment			6
	98	Mammalia (Large)	Indeterminate	Fragment			5

Table 108, continued

Site	Accn	Taxon	Element	Portion of Element	Side	Comments	Totals
41CV1269, continued	116	Small/Medium Vertebrata	Long bone	Diaphyseal fragment			1
	116	Mammalia (Medium/Large)	Indeterminate	Fragment		Stained?	1
	117	Vertebrata	Indeterminate	Fragment			1
	117	Artiodactyla	Tooth, perm./decid. ind.	Enamel fragment			1
	118	Vertebrata	Indeterminate	Fragment			25
	118	Mammalia (Medium/Large)	Indeterminate	Fragment			2
	119	Vertebrata	Indeterminate	Fragment			23
	119	Mammalia (Medium/Large)	Indeterminate	Fragment			3
	120	Vertebrata	Indeterminate	Fragment			7
	122	Vertebrata	Indeterminate	Fragment			1
	123	Vertebrata	Indeterminate	Fragment			1
	124	Vertebrata	Indeterminate	Fragment			1
	125	Vertebrata	Indeterminate	Fragment			1
	126	Vertebrata	Indeterminate	Fragment			4
	126	Mammalia (Medium/Large)	Indeterminate	Fragment			7
	126	Mammalia (Medium/Large)	Indeterminate	Fragment			1
	126	Mammalia (Medium/Large)	Long bone	Diaphyseal fragment			3
	126	Artiodactyla	Tooth, perm./decid. ind.	Enamel fragment			1
Subtotal							254
Sample Total							1,008

without question, as reflecting human activity. More-recent taphonomic scrutiny, however, has shown that burned bone can be recovered from nonarcheological contexts. Thus, burning is not definitive of human behavior (Klein and Cruz-Urbe 1984:6-7; Lyman 1994:388-389). Recent experiments by Bennett (1996) have shown that bone can even be burned after burial, if deposited in a rich organic matrix. Burned bone can result from natural forest fires, and has even been reported from woodrat nests (Hockett 1989). Context and archeological feature association are among the greatest aids in interpreting burned bone.

Data on burned bone are presented by site in Table 107. Site 41CV1269 contained the highest percentage of burned bone (32.68 percent;  $n = 83$ ), followed by 41CV1235 (19.86 percent;  $n = 110$ ) and 41CV988 (14.29 percent;  $n = 1$ ). Given that these remains were recovered from archeological contexts, it is likely that the burning reflects human activity, though as the discussion above illustrates, burning can result from other taphonomic agents as well.

#### ***Weathering and Degradation***

The majority of the sample shows heavily degraded and weathered bone surfaces. As indicated in Table 107, only 5.95 percent ( $n = 60$ ) of the specimens show lightly degraded surfaces. The highest frequency of lightly degraded bone was noted at 41CV1269 (11.74 percent,  $n = 31$ ). Degradation could have resulted from numerous forces, including repeated wetting and drying, sun exposure, plant rootlet etching, carnivore digestion, bird digestion, water abrasion, and groundwater dissolution (Andrews 1990; Fisher 1995). Rootlet etching, fine-line cracking, and chemical dissolution were all noted in the sample. The exact nature of the degradation is difficult to access, since numerous factors may act on a single bone and may mask other forms of modification. Groundwater dissolution (Hedges and Millard 1995) and bone leaching, for example, are common in the limestone settings of central Texas (Sanchez 1993:45-46), and may be difficult to distinguish from the gastrointestinal etching and digestion of carnivores.

Pitting was also noted on many bones in the sample. Roughly 48 percent ( $n = 481$ ) of the sample is pitted (see Table 107). Sites 41CV1235

(56.86 percent,  $n = 315$ ) and 41CV1122 (53.91 percent,  $n = 62$ ) showed the highest degree of pitting. Pits can result from predator digestion or various postdepositional dissolution processes. Sanchez (1993) also noted extensive pitting of bone recovered from Fort Hood and attributed it to postdepositional processes associated with the limestone substrate and leaching. Only a few examples of staining were noted (see Table 108), which can be attributed to predator digestion (Schmitt and Juell 1994) or postdepositional matrix staining. Several specimens also showed calcium carbonate encrustations (see Table 108), which also were noted on Fort Hood faunal remains previously described by Baker (1999).

#### ***Intrusive vs. Cultural Faunas***

The human association of a faunal assemblage can often be difficult to establish. This is especially true of microvertebrate assemblages (Andrews 1990; Stahl 1996). Bone assemblages can accumulate from a range of taphonomic processes. Several previous studies of Fort Hood faunal assemblages have addressed this issue and have described the difficulty of interpreting faunas recovered from rockshelters in this area (Baker 1999; Sanchez 1993). However, all of the faunas in the present study were recovered from open prehistoric campsites. While open sites are not free of problems in taphonomic interpretation, researchers generally have greater confidence that faunas from these sites reflect human involvement. The archeological context, open settings of the sites, and the nature of the burned and fragmented assemblages are all consistent with assemblages resulting from human procurement. However, a lack of butchering marks makes it difficult to interpret individual bones as food refuse.

The only conspicuously intrusive bone is the pig metapodial from 41CV988. This specimen was recovered in the Feature 2A flotation sample from Feature 1. Since domestic pigs were introduced to North America by Europeans, the presence of a pig bone in a late Archaic hearth is evidence of postdepositional intrusion and/or disturbance (see Chapter 6).

#### ***Cultural Modifications***

No cut marks were identified on any of the

bones in the sample. In addition, no bone tools or bone artifacts were noted.

***Rodent Gnawing***

Two rodent-gnawed bones were identified from 41CV1235 and 41CV1250 (see Table 107). While subjective, this frequency of gnawed bone is relatively low compared to other samples from this area and may suggest that these samples were buried relatively rapidly.

**SUMMARY**

The sample is generally typical of other assemblages from the area. Notable exceptions include a lack of riparian taxa and a near absence of rodent gnawing. The three sites from the Paluxy sand formation show poor faunal preservation. The best preservation, in terms of total specimens, was noted at 41CV1235, 41CV1269, and 41CV1122. These sites also show high frequencies of spiral fractures, burning.

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## **APPENDIX E: Recovery and Analysis of Macrobotanical Remains**

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## INTRODUCTION

During the 1996 testing project, charred remains were recovered as individual charcoal samples and flotation sediment samples. Ninety-three charcoal samples were recovered from 28 analysis units at 22 sites, while 140 flotation samples were taken from 39 analysis units at 30 sites (Table 109). Most of the flotation samples ( $n = 133$ , 95 percent) were taken from cultural features in an attempt to recover charred remains associated with cooking activities. Flotation sample sizes ranged from 0.5 liters to 100 liters, but 60 percent of the samples ( $n = 84$ ) were 7 liters.

Nine charcoal samples from 7 sites and 49 flotation samples from 19 sites were submitted for macrobotanical identification; results of these studies are presented herein. The archeobotanical assemblage from each site and site group is briefly summarized, and the data are subsequently discussed as evidence of prehistoric resource utilization.

Nonflotation charcoal samples were recovered in situ during excavations and in screens while sifting archeological sediments. Nine of these samples were submitted for radiocarbon dating. These samples were handled carefully to avoid any potential contamination, but were not specially prepared. The carbonized wood fragments were identified by the using the snap method described below. Once the samples were examined, they were sent for radiocarbon dating.

Prewitt and Associates, Inc. completed flotation processing of the sediment samples using a Flote-Tech flotation system. This machine washes away sediments suspended in the water while separating lighter charred plant remains into a light fraction and denser nonsoluble remains into a heavy fraction. Following this, both the light and heavy fractions of each sample were scanned and artifacts and cultural debris were removed for cataloging. Observations relating to the presence and absence of charred remains were made, and the preservation potential of each sample was evaluated. Based on assessments of preservation potential, 49 flotation samples from sites recommended as eligible for listing in the National Register of Historic Places were then submitted for detailed macrobotanical analysis.

Standard archeobotanical laboratory procedures were followed during the analysis of

flotation samples. Each light fraction sample was sorted through a series of four nested geological screens with mesh sizes of 4, 2, 1, and 0.45 mm. The material caught on all of the sieve levels, including the pan, was scanned for floral parts, fruits, and seeds. All observed disseminules were identified and counted; carbonized macrobotanical remains were then sorted and identified. Identification of all carbonized wood was accomplished by using the snap technique, examining them at 8x to 45x magnifications with a hand lens or a binocular dissecting microscope, and comparing them to samples in the herbarium at the Texas A&M University Archaeobotanical Laboratory. All seed identifications were made using reference collections at the Archaeobotanical Laboratory and the Tracy Herbarium, Texas A&M University.

The heavy fraction of each sample was scanned for charred materials, which were separated for identification. For quantification purposes, carbonized material from the heavy fraction was combined with the material for the light fraction. However, in the tables, a distinction is made between heavy fraction and light fraction results to aid in decisions regarding data recovery.

Due to the poor preservation encountered at most open sites, only carbonized plant remains were considered for inclusion in the archeological assemblage. Although some uncarbonized plant material was noted to aid in understanding the postdepositional formation processes occurring at the sites, uncarbonized materials were not included in any quantification of macrobotanical remains.

Identification of plant storage root material—including bulbs, corms, tubers, and other underground storage organs—remains problematic. Some success has been reported in attempts to assign a taxonomic category to these structures, but no general method has been developed (Hather 1991). Identification of roots in the archeological record, even in contexts where the plants are known to be cultivated (e.g., sweet potato or manioc), has proven difficult (Holden et al. 1995). In the current study, the carbonized root material was carefully examined in order to determine the type of underground storage organ represented by the specimens. Results indicate that this material consisted of corms rather than bulbs.

A corm is defined as a modified stem, whereas

**Table 109. Summary of charcoal and flotation samples**

Site	Number of Charcoal Samples		Number of Flotation Samples	
	Feature Context	Nonfeature Context	Feature Context	Nonfeature Context
<b>PALUXY SITES</b>				
41CV947	1	1	5	—
41CV984	—	2	7	1
41CV988	7	—	2	—
41CV1043	—	—	1	—
41CV1049	4	3	6	—
41CV1050	—	—	—	—
41CV1093	—	—	7	—
41CV1106	—	1	3	—
41CV1138	1	4	4	—
41CV1143	1	1	2	—
41CV1191	—	2	5	—
41CV1194	2	—	2	—
41CV1258	—	—	1	—
41CV1283	—	—	—	—
Subtotals	16	14	45	1
<b>HOUSE-RIPSTEIN CREEK SITES</b>				
41CV578	7	3	5	—
41CV1211	—	2	—	1
41CV1218	—	—	—	—
41CV1219	—	3	—	1
41CV1221	—	3	3	—
41CV1222	—	—	—	—
41CV1225	—	—	—	—
41CV1235	2	—	20	—
41CV1250	4	2	4	1
41CV1269	10	4	15	—
41CV1275	—	—	—	1
41CV1282	2	—	—	—
41CV1286	—	2	—	1
41CV1287	—	—	1	—
41CV1308	—	—	—	—
Subtotals	25	19	48	5
<b>COWHOUSE-TABLE ROCK-COTTONWOOD CREEK SITES</b>				
41CV1012	—	—	—	—
41CV1030	—	—	2	1
41CV1048	—	—	5	—
41CV1120	1	—	2	—
41CV1122	1	6	8	—
41CV1133	—	1	13	—
41CV1137	—	—	—	—
41CV1206	6	4	4	—
Subtotals	8	11	34	1
<b>OTHER SITES</b>				
41CV340	—	—	—	—
41CV755	—	—	—	—
41CV957	—	—	3	—
41CV1092	—	—	3	—
41CV1152	—	—	—	—
Subtotals	0	0	6	0
<b>Totals</b>	<b>49</b>	<b>44</b>	<b>133</b>	<b>7</b>

a bulb is a modified leaf. The significance of this difference lies in the fact that many leaf scales of bulbs retain distinctive epidermal or cuticular patterns which may be assignable to a genus or species (Dering 1997). Corms lack these patterns, and thus the question of identification becomes more complex.

In order to resolve this identification problem, the corm of one of the most likely edible root plants in the Fort Hood area, spring beauty (*Claytonia virginica*), was studied. Spring beauty has been reported to be used by several Indian groups (Havard 1895). It contains 1.8 percent nonreducing sugars and 8.5 percent starch, suggesting that these plants minimally require short-term baking (i.e., a few hours) and perhaps need longer-term baking in order to release stored carbohydrates (Yanovsky and Kingsbury 1938).

Reference specimens were compared to the archeological material, but most gross features were not diagnostic and external observations did not yield a positive identification. Several specimens of spring beauty were obtained and were baked using an electric kiln in an oxygen deficient environment for 4 hours at 400°C. Each specimen then was compared to the archeological materials, but most gross features were not diagnostic, and external observations did not yield a positive identification. A scanning electron microscope was then utilized to record any distinctive sculpturing of reference materials or the archeological material. This was done to see if distinctive features in the archeological material had survived charring and postdepositional site formation processes.

Fragments of both modern reference and archeological specimens were attached to stubs using AQUADAG colloidal graphite. After drying for 24 hours in a desiccator, the samples were coated by pumping a vacuum chamber down to 60 millitorr and coating the target for 8 minutes. A thick coating produced the best results.

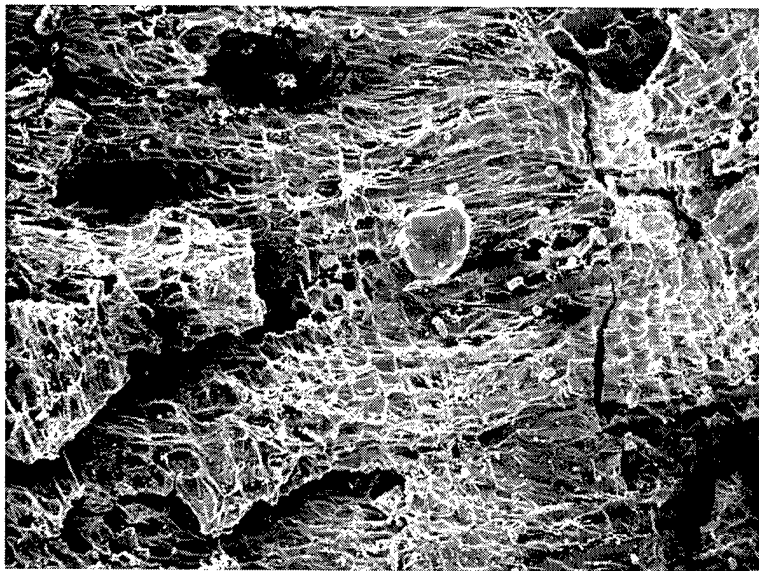
Using the SEM, the material was examined at low magnification; no distinctive cell patterns were found. This is problematic because Hather (1991) reports that these characteristics may be identified. However, Hather has devoted several years of research to the single issue of root identification. No descriptions of the cellular structure of spring beauty are available, but it is important to note whether archeological materials retain sufficient structural integrity to identify

the shapes of parenchymous tissue, and to establish baseline characteristics for the root storage structures of all potentially edible plants that grow in the region. This is beyond the scope of this paper, but I have begun the process. The difficulty, and the process of identifying root remains has been stated clearly:

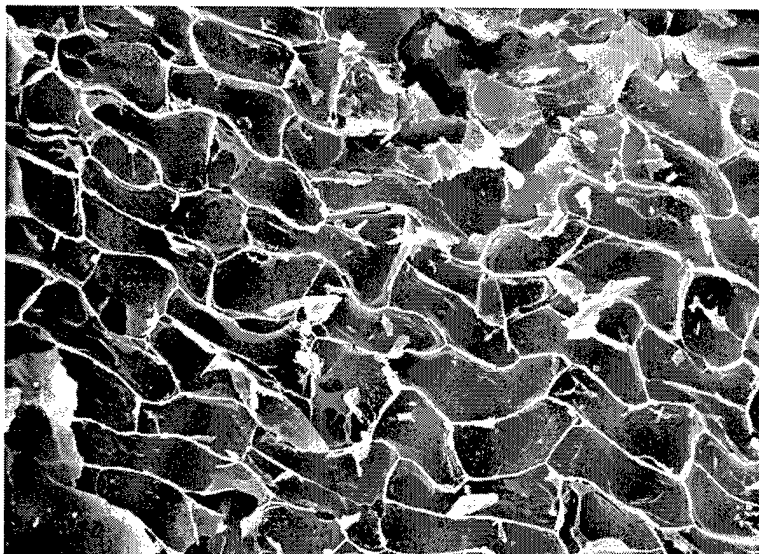
It is important to note here that identifications are only really possible if adequate reference material is available. By using the character outlined here, charred tissues may be accurately described in anatomical and morphological terms. These characters may then be used to compare with modern reference material, both in the form of modern experimentally charred tissues and stained thin sections. Classical anatomical and morphological characters have to be used alongside artifactual characters, derived from the process of charring, together with an examination of a wide range of states of tissues from a wide range of taxa. Only in this way can an identification be reached with any degree of certainty [Hather 1991:674].

Three major problems were encountered at the onset of the identification efforts. First, initial efforts to find a readily recognizable structure in the archeological material failed. Often the conditions surrounding the charring of the archeological material destroy some or all of the internal structure of the bulb or corm. The scanning electron microscope photographs in Figure 154 illustrate this problem. Figure 154a shows that no distinctive cell structure is preserved in sections of the archeological materials examined to date. Figure 154b illustrates the distinctive structure present on the leaf scales of bulbs, which were somewhat easier to work with. This does not mean that there is no distinctive structure in the corm materials, only that one has not been discovered.

A second analytical problem is that the description of the structure of spring beauty corm will require a long-term effort. Finally, although spring beauty produces an edible corm and probably grows in the study region, at this time we do not know how many other corm-bearing plants grow on Fort Hood. As Hather (1991) suggests, it will be necessary to collect



a



b

**Figure 154.** Scanning electron microscope photographs. (a) Photograph of an unknown corm from 41CV988 (Flotation Sample 1, Feature 2A); (b) Photograph of the epidermal cells of the leaf scales of false garlic, *Nothoscordum bivalve*.

and review all potentially edible plants with similar storage organs that may have grown in the region.

All charred seeds and fruit and nut fragments were counted. Identifications were made using reference collections at Texas A&M University. Carbonized wood was treated in the same manner. For flotation samples in which a

large amount of wood was encountered, a sample of 35 pieces from the 6-mm and 3-mm mesh sieves was examined.

The anatomy of some woods is so similar that it is very difficult to identify small fragments to the genus level. In other cases, genera within a plant family are usually distinguishable, but some of the archeological material is often too fragmented or deteriorated to allow identification to the genus level. For these reasons, some taxa are combined into wood types. All identifications in the "type" category represent identifications to the taxon level indicated by the name of the type. The following wood types or categories are used in this report:

**Juniper/Bald Cypress Wood Type** (*Juniperus* sp. and *Taxodium distichum*): Both of these trees are members of the plant family Cupressaceae, and their wood is indistinguishable under low-magnification cross sections. The material from Fort Hood is most likely juniper.

**Elm Family Wood Type** (Ulma-ceae): Includes many species of hackberry and elm. These are distinguishable if the specimen is large and well preserved.

**Willow/Cottonwood Wood Type** (Salicaceae): Includes two members of the Salicaceae family, willow and cottonwood, which are difficult

to distinguish.

**Rose Family Wood Type** (Rosaceae): Includes hawthorns, wild plums, and wild peaches. Small fragments of the wood are usually very difficult to distinguish.

**Indeterminate Hardwood:** Refers to any woody seed-bearing plant, i.e., not a cone-bearing tree such as pine, cypress, or juniper.

## RESULTS OF WOOD SPECIES IDENTIFICATION OF CHARCOAL SAMPLES

Nine samples of charred wood from cultural features were submitted for wood identification prior to being sent for radiocarbon dating. These samples were identified as oak, hackberry, juniper, and indeterminate wood (Table 110).

## RESULTS OF MACROBOTANICAL ANALYSIS OF FLOTATION MATERIALS

### Archeobotanical Assemblage

Nutshell, root fragments, and wood were identified among the charred remains recovered from flotation samples (Table 111). These samples yielded 14 different plant taxa or wood types. Of the 49 samples analyzed, 29 (59.2 percent) yielded identifiable plant remains. The taxa count was moderate, and the percentage of productive samples relatively low, yet the abundance of carbonized material was fairly high in some samples, most notably from 41CV988, 41CV1069, 41CV1250, and 41CV1269.

A total of 1,017 wood, nutshell, and corm fragments was recovered from the 49 samples.

Wood comprised the great majority of the charred remains—932 fragments (91.6 percent) weighing 51.8 g. The fact that no identifiable seeds or fruit fragments other than nutshells were encountered in the samples may suggest generally poor conditions for preservation. Nutshell fragments were very small and were identified as pecan, or thin and thick nut shell. Corm fragments were identified in Feature 4 at 41CV988, a hearth situated in Paluxy sands in western Fort Hood.

Wood remains were dominated by oak and the willow family, which were the most frequent and abundant of the 11 wood types identified (Table 112). A riparian component was represented by pecan and walnut wood. Identifications have not yet been secured for the corm fragments.

Nutshell fragments measuring from 2–8 mm were recovered from five sites in the Paluxy (41CV1093 and 41CV947) and House-Ripstein (41CV578, 41CV1235, and 41CV1250) site groups. The small size and abraded condition of the nutshell fragments precluded positive identification of much of the material. However, pecan shell was identified from 41CV578, and other thin-shelled nut fragments which may be pecan were identified at 41CV947 and 41CV1250. Thick-shelled nut remains are most likely walnut since hickory trees do not grow in the

Table 110. Results of wood identification analysis

Site and Analysis Unit	Sample Number*	Feature and Type	Sample Weight (g)	Identified Taxon
<b>PALUXY SITES</b>				
41CV947, Analysis Unit 1	C-2	Feature 2, hearth	0.8	<i>Quercus</i> sp.
41CV988, Analysis Unit 1	C-7	Feature 4, hearth	1.2	<i>Quercus</i> sp.
41CV1049, Analysis Unit 1	C-3	Feature 7, hearth	6.4	<i>Quercus</i> sp.
<b>HOUSE-RIPSTEIN CREEK SITES</b>				
41CV578, Analysis Unit 1	C-9	Feature 9, hearth	2.4	<i>Quercus</i> sp.
41CV1250, Analysis Unit 1	C-4	Feature 4, occupation zone	24.2	<i>Quercus</i> sp.
41CV1250, Analysis Unit 2	C-2	Feature 5, hearth	0.8	<i>Quercus</i> sp.
41CV1269, Analysis Unit 2	C-1	Feature 3, hearth	6.6	<i>Juniperus</i> sp., <i>Quercus</i> sp., or indeterminate sp.
41CV1269, Analysis Unit 3	C-7	Feature 2, burned rock midden	1.3	<i>Quercus</i> sp.
<b>COWHOUSE-TABLE ROCK-COTTONWOOD CREEK SITE</b>				
41CV1030	F-2	Feature 2, burned rock concentration	2.7	<i>Celtis laevigata</i>

\*C samples are charcoal; F sample is charcoal picked from a flotation sample.

**Table 111. Plant taxa identified in flotation samples**

Taxon	Common	Part
<i>Carya illinoensis</i>	Pecan	Nut, wood
<i>Celtis</i> sp.	Hackberry	Wood
<i>Fraxinus</i> sp.	Ash	Wood
<i>Ilex</i> sp.	Holly Family Wood Type	Wood
Indeterminate	—	Corm
Indeterminate	—	Fruit
Indeterminate	—	Nutshell--thick
Indeterminate	—	Nutshell--thin
Indeterminate	—	Wood
Indeterminate Hardwood	Indeterminate Hardwood	Wood
<i>Juglans</i> sp.	Walnut	Wood
<i>Juniperus</i> sp.	Juniper	Wood
<i>Quercus fusiformis</i>	Plateau Liveoak	Wood
<i>Quercus</i> sp.	Oak	Wood, wood burl
Rosaceae	Rose Family Wood Type	Wood
Salicaceae	Willow Family Wood Type	Wood
<i>Salix</i> sp.	Willow	Wood
Ulmaceae	Elm Family	Wood
<i>Ulmus</i> sp.	Elm, cf. American elm	Wood

**Table 112. Wood frequencies from flotation samples**

Taxon	Common	Frequency (%)
<i>Carya illinoensis</i>	Pecan	2.0
<i>Celtis</i> sp.	Hackberry	4.1
<i>Fraxinus</i> sp.	Ash	4.1
<i>Ilex</i> sp.	Holly	2.0
<i>Juglans</i> sp.	Walnut	2.0
<i>Juniperus</i> sp.	Cedar, juniper	4.1
<i>Quercus</i> sp.	Oak	69.4
<i>Quercus fusiformis</i>	Live oak	6.1
Rosaceae	Rose Family wood (e.g. hawthorn, wild plum, etc.)	4.1
Salicaceae	Willow Family	20.0
Ulmaceae	Elm Family (e.g. elm or hackberry)	2.0
<i>Ulmus</i> sp.	Elm, cf. American elm	2.0

area today.

The following discussions summarize the data potential of individual sites and site groups. The small sample size limits the scope of statements that can be made regarding geographic or temporal variation within the assemblage.

#### **Paluxy Site Group**

Thirteen flotation samples from nine Paluxy sites were examined. Nine of the 13 samples (69.2 percent) yielded identifiable carbonized plant remains. Wood included ash, oak, rose

family, willow family, and holly family wood types. The variety of wood remains was complemented by the recovery of corm fragments at 41CV988, possible evidence of the utilization of geophytic plant resources in the region. Thick and thin nutshells were noted in samples from 41CV947 and 41CV1093. Wood fragments totaled 349 and weighed 21.98 g. Ten nutshell fragments and 13 corm fragments also were recovered from the samples (Table 113).

Two samples from hearths at 41CV1049 contained wood fragments of walnut, ash, willow family, hackberry, and rose family. The multiple

Table 113. Plant remains from the Paluxy site group

Site	Feature	Feature Type	Sample	Taxon	Part	Count	Weight (g)	Fraction
41CV1049	1A	Hearth	F-1	<i>Fraxinus</i> sp.	Wood	4	0.10	LF
				<i>Quercus</i> sp.	Wood	22	0.90	HF
				<i>Quercus</i> sp.	Wood	12	0.10	LF
				Rosaceae	Wood	6	0.10	LF
				Salicaceae	Wood	14	0.30	LF
				<i>Celtis</i> sp.	Wood	11	0.20	LF
				<i>Juglans</i> sp.	Wood	4	0.10	LF
				<i>Quercus</i> sp.	Wood	35	0.40	NF
				<i>Quercus</i> sp.	Wood	35	8.70	LF
				Salicaceae	Wood	7	0.30	LF
Subtotals						150	11.20	
41CV1093	4	Burned rock mound	F-6	<i>Fraxinus</i> sp.	Wood	4	0.10	HF
				Indeterminate	Nutshell-thick	5	0.10	HF
				<i>Quercus</i> sp.	Wood	35	5.30	LF
				<i>Quercus</i> sp.	Wood	1	0.10	HF
				<i>Quercus</i> sp.	Wood	35	1.90	NF
				Rosaceae	Wood	5	0.10	LF
						85	7.60	
Subtotals								
41CV1106	4	Occupation zone	F-1	No carbonized remains	N/A	-	-	LF
41CV1138	1	Hearth	F-2	<i>Quercus</i> sp.	Wood	2	0.05	LF
41CV1143	6	Hearth	F-2	No carbonized remains	N/A	-	-	-
41CV1191	2	Hearth	F-4	Indeterminable	Wood	8	0.39	LF
	3	Burned rock concentration	F-5	<i>Quercus</i> sp.	Wood	3	0.04	LF
Subtotals						11	0.43	
41CV947	2	Slab hearth	F-3	Indeterminate	Nutshell-thin	4	0.10	HF
				Indeterminate	Nutshell-thick	1	0.10	HF
				<i>Quercus</i> sp.	Wood	14	0.10	HF
				<i>Quercus</i> sp.	Wood	8	0.10	LF
						27	0.40	
Subtotals								
41CV984	2	Burned rock mound	F-4	No carbonized remains	N/A	-	-	LF
			F-6	No carbonized remains	N/A	-	-	LF
Subtotals						0		



Table 113, continued

Site	Feature	Feature Type	Sample	Taxon	Part	Count	Weight (g)	Fraction
41CV988	2A	Hearth	F-1	Indeterminate	Corn	8	0.50	LF
				Indeterminate	Corn	5	0.50	HF
	4	Hearth	F-2	<i>Quercus</i> sp.	Wood	35	2.10	LF
				<i>Ilex</i> sp.	Wood	4	0.10	LF
				Indeterminate	Wood	11	0.10	LF
				Indeterminate hardwood	Wood	16	0.10	HF
				<i>Quercus</i> sp.	Wood	18	0.20	LF
						97	3.60	
	Subtotals							
	Totals						372	23.28

wood types from these hearths may suggest that the charcoal is related to multiple use episodes.

The sample from Feature 4, a burned rock mound at 41CV1093, produced abundant wood charcoal, including ash, oak, and rose family wood. In addition, thick nutshell (probably walnut) was noted in the sample.

By contrast, samples from 41CV984, 41CV1106, 41CV1138, and 41CV1143 produced very little evidence. The samples from 41CV1106 and 41CV1143 contained no carbonized plant remains, and the sample from 41CV1138 contained two small fragments of oak wood. No plant remains were noted in the two samples from 41CV984.

Samples from 41CV1191 contained oak wood and indeterminate wood fragments. The material from these samples was very fragile and tended to crumble when handled. Postdepositional weathering processes had deteriorated the charred wood fragments to the point that recognizing anatomical characteristics was virtually impossible.

A single sample from a slab hearth (Feature 2) at 41CV947 contained two kinds of nutshells and oak wood. The nutshell fragments were smaller than 3 mm wide, making positive identification difficult. The total weight of the 14 charred wood fragments from the sample was very low, indicating the very small size of individual specimens.

Samples from 41CV988 contained wood and corm fragments. Sample F-1 from hearth Feature 2A contained charred oak wood and 13 fragments of an underground storage organ, most likely a corm. As discussed above, it is difficult to identify the vegetative parts of a plant, especially the softer tissue of food storage organs. A second hearth, Feature 4, contained holly family wood, oak wood, and an unidentified hardwood.

#### ***House-Ripstein Site Group***

These sites are located on House and Ripstein Creeks, which are tributaries of Cowhouse Creek, in west Fort Hood. Eighteen samples from four archeological sites were examined from this group. Twelve of the 18 samples (66.7 percent) yielded identifiable carbonized plant remains. A total of 617 carbonized plant fragments weighing 32.12 g were recovered from the House-Ripstein samples. Six

woods were noted in the assemblage from these sites—elm family, oak, willow family, elm, juniper, and hackberry. Nutshell types include thin and thick shell. Larger fragments of thin nutshell from 41CV578 (F-5) were identified as pecan. The thick nutshell fragments, tentatively identified as walnut, were recovered from 41CV578 and 41CV1250 (Table 114).

Three of six samples from 41CV1235 yielded wood and nutshell fragments. Two samples from a burned rock midden (Feature 1) contained moderate quantities of oak and willow wood. Thin nutshell (probably pecan) and oak wood was recovered from a hearth (Feature 4). Two samples from burned rock concentrations (Features 3 and 6) and one from a hearth (Feature 7) contained no carbonized plant remains.

The two samples from 41CV1250 contained four wood types and two nutshell types. Thick nutshell (probably walnut) and thin nutshell (probably pecan) were identified in a sample from Feature 5, a hearth. The same feature contained willow family and oak wood. An occupation zone (Feature 4) contained willow family, elm family, and hackberry wood.

Six of seven samples from 41CV1269 were productive, and these contained oak, juniper, and willow family wood. No potential plant food resources were identified in the archeobotanical assemblage from this site. Samples from Features 1 and 2 (burned rock middens), and Feature 3 (a hearth) contained oak and juniper wood. Small fragments of charcoal from the ash anomaly (Feature 4) could only be identified as indeterminate hardwood.

Although two of the three samples from site 41CV578 were unproductive, the third sample (F-5) from Feature 9 yielded two kinds of nutshells, unidentified fruit fragments, elm wood, and oak wood. The only positively identified pecan shell fragments were noted in this sample, and the 12 smaller thin nutshell fragments are probably pecan as well. The thick nutshells closely resemble walnut, although the fragments were too small and abraded to identify.

The samples from the House-Ripstein sites were quite productive on the whole, yielding information regarding the exploitation of the riparian corridor represented by the Cowhouse Creek drainage system. Although the assemblage lacks any indication of what other plant resources were being utilized, the samples do

Table 114. Plant remains from the House-Ripstein site group

Site	Feature	Feature Type	Sample	Taxon	Part	Count	Weight (g)	Fraction	
41CV1235	1	Burned rock midden	F-7	<i>Quercus</i> sp.	Wood	23	0.08	LF	
				<i>Quercus</i> sp.	Wood	13	0.04	HF	
				<i>Quercus</i> sp.	Wood	6	0.15	HF	
				<i>Quercus</i> sp.	Wood	7	0.11	LF	
				<i>Salix</i> sp.	Wood	2	0.05	LF	
	3	Burned rock concentration	F-3	No carbonized remains	N/A	-	-	LF	
	4			Hearth	F-16	Indeterminate	Nutshell-thin	4	0.03
				Indeterminate	Wood	2	0.01	LF	
	6	Burned rock concentration	F-18	<i>Quercus</i> sp.	Wood	9	0.11	HF	
	7			Hearth	F-20	No carbonized remains	N/A	-	LF
				No carbonized remains	N/A	-	-	-	
Subtotals						66	0.58		
41CV1250	4	Occupation zone	F-4	<i>Celtis</i> sp.	Wood	14	0.40	LF	
				Indeterminate hardwood	Wood	27	0.30	HF	
				<i>Quercus</i> sp.	Wood	35	7.10	LF	
				Salicaceae	Wood	3	0.10	LF	
				Salicaceae	Wood	7	0.50	LF	
				Ulmaceae	Wood	4	0.10	LF	
				Indeterminate	Nutshell-thin	7	0.20	HF	
				Indeterminate	Nutshell-thick	2	0.10	HF	
				<i>Quercus</i> sp.	Wood	28	2.60	NF	
				<i>Quercus</i> sp.	Wood	35	2.80	LF	
	5	Hearth	F-2	<i>Quercus</i> sp.	Wood	17	0.30	LF	
				Salicaceae	Wood	7	0.20	NF	
Subtotals						186	14.70		
41CV1269	1	Burned rock midden	F-5	<i>Quercus</i> sp.	Wood	6	0.20	HF	
				<i>Quercus</i> sp.	Wood	3	0.88	LF	
				<i>Quercus fusiformis</i>	Wood	35	6.40	LF	
				<i>Quercus fusiformis</i>	Wood	27	0.52	LF	
				No carbonized remains	N/A	-	-	-	
	2	Burned rock midden	F-9	<i>Juniperus</i> sp.	Wood	4	0.13	LF	
				<i>Quercus</i> sp.	Wood	35	0.20	LF	
				<i>Quercus</i> sp.	Wood	1	0.01	HF	
				Salicaceae	Wood	2	0.03	HF	
				<i>Juniperus</i> sp.	Wood	12	0.17	LF	
	3	Hearth	F-3						

Table 114, continued

Site	Feature	Feature Type	Sample	Taxon	Part	Count	Weight (g)	Fraction
41CV1269, continued	3	Hearth	F-3	<i>Quercus</i> sp.	Wood	35	2.30	LF
	4	Ash anomaly	F-2	Indeterminate hardwood	Wood	15	0.30	LF
				Indeterminate hardwood	Wood	34	0.60	HF
	6	Hearth	F-15	<i>Quercus fusiformis</i>	Wood	35	1.30	LF
Subtotals						244	13.04	
41CV578	5	Hearth	F-1	No carbonized remains	N/A	-	-	-
	7	Hearth	F-2	No carbonized remains	N/A	-	-	-
	9	Hearth	F-5	<i>Carya illinoensis</i>	Nut	3	0.10	HF
				Indeterminate	Fruit	2	0.10	HF
				Indeterminate	Nutshell—thick	3	0.10	HF
				Indeterminate	Nutshell—thin	12	0.10	HF
				Indeterminate hardwood	Wood	42	0.30	LF
				<i>Quercus</i> sp.	Wood burl	27	2.60	HF
				<i>Quercus</i> sp.	Wood	28	0.40	LF
				<i>Ulmus</i> sp.	Wood	4	0.10	LF
	Subtotals						121	3.80
Totals						617	32.12	-

demonstrate a high potential for the recovery of macrobotanical resources.

#### ***Cowhouse-Table Rock-Cottonwood Site Group***

The Cowhouse-Table Rock-Cottonwood site group includes sites situated in the upper Cowhouse Creek drainages in west-central Fort Hood, including sites along Table Rock and Cottonwood Creeks. Seventeen flotation samples from five sites were examined. Samples from these sites were not very productive; 7 of the 17 samples (41.2 percent) contained carbonized plant remains. Only two wood types, oak (*Quercus* sp.) and willow family (Salicaceae), were identified in the samples. No fruit fragments, nut fragments, or other plant remains were recovered (Table 115).

Of the nine samples examined from 41CV1133, only two yielded identifiable carbonized plant remains (identified as indeterminate hardwood or oak wood). Although the five samples from 41CV1122 contained plant remains, the return from each sample amounted to no more than 2–4 fragments of wood weighing less than 0.1 g each. The total return for all 17 samples from the Cowhouse-Table Rock-Cottonwood Creeks group was 28 wood fragments weighing 3.32 g.

#### ***Other Sites***

A single sample from 41CV957, located along Shoal Creek in northwestern Fort Hood, contained no carbonized plant remains.

#### **Discussion and Recommendations**

The purpose of this analysis was to evaluate the potential for each site and site group to yield identifiable botanical remains and interpretable subsistence data. A secondary goal was to comment on prehistoric plant utilization based on the preliminary data presented herein.

The results of these samples, spread across 19 sites, indicate that the region as a whole has a very good potential for generating new information regarding plant use and plant distribution. Some of the sites and areas, however, appear to hold much more potential than others.

The most productive samples were recovered from the House-Ripstein site group.

Abundant material was observed from 41CV1235, 41CV1250, and 41CV1269. In addition, identifiable pecan shells were noted in 41CV578. Although no seeds were noted in these samples, the recovery of quantities of carbonized plant material suggests considerable potential for generating more information on plant utilization in the region.

By contrast, samples from the Cowhouse-Table Rock-Cottonwood Creek site group were not productive. Over half the samples yielded no identifiable plant remains. Only two taxa were identified in 13 samples, suggesting that if these features are typical, preservation of macrobotanical remains in sites in this area may be poor. Likewise, the single sample from 41CV957 along Shoal Creek was unproductive. However, if further excavation uncovers archeological features in these areas with well-defined carbon stains or other inclusions indicating the possibility of charred plant material, flotation samples should be secured and analyzed.

The Paluxy site group samples were both moderately productive and very interesting. The recovery of charred root material in a recognizable and potentially identifiable condition is a rare occurrence. The fact that these samples yielded storage roots, nutshell fragments, and wood indicates that more-intensive sampling of these sites may be productive. The recovery of useful data would be contingent upon excavating and sampling well-preserved features such as hearths or larger cooking pits.

This analysis produced some information of interest to subsistence and paleoecological studies, but interpretation or explanation of the data should be cautious. The recovery of possible walnut and pecan fragments from hearths does not necessarily indicate their specific function, but does suggest that activities involving nut processing or nut fat rendering may have taken place in the vicinity of the features.

The charred storage root fragments from the Feature 2A hearth at 41CV988 may provide direct evidence of the function of some of the features in the region. As a defensive mechanism, roots contain secondary metabolites and food stored in chemicals that render plants indigestible to most predators (Johns 1990). A fundamental strategy for accessing this food energy is to apply heat for long periods of time using heated rocks. The combination of charred plant material and burned rock features

Table 115. Plant remains from the Cowhouse-Table Rock-Cottonwood site group

Site	Feature	Feature Type	Sample	Taxon	Part	Count	Weight (g)	Fraction
41CV1048	1	Burned rock midden	F-4	Indeterminate	Wood	2	0.10	LF
41CV1120	1	Burned rock concentration	F-1	No carbonized remains	N/A	-	-	-
	2	Burned rock concentration	F-2	<i>Quercus</i> sp.	Wood	2	0.10	LF
Subtotals				<i>Quercus</i> sp.	Wood	1	0.10	HF
						3	0.20	
41CV1122	2	Burned rock midden	F-4	Indeterminate	Wood	4	0.10	HF
	4	Hearth	F-8	Indeterminate	Wood	2	0.10	HF
Subtotals				<i>Quercus</i> sp.	Wood	2	0.10	HF
				<i>Quercus</i> sp.	Wood	3	0.10	LF
41CV1133				Salicaceae	Wood	3	0.10	HF
	5	Burned rock concentration	F-7	No carbonized remains	N/A	-	-	LF
Subtotals						14	0.50	
41CV1133	1	Burned rock midden	F-8	No carbonized remains	N/A	-	-	LF
			F-9	No carbonized remains	N/A	-	-	LF
Subtotals				No carbonized remains	N/A	-	-	LF
				No carbonized remains	N/A	-	-	-
41CV1206				No carbonized remains	N/A	-	-	LF
	2	Hearth	F-1	No carbonized remains	N/A	-	-	LF
Subtotals				<i>Quercus</i> sp.	Wood	1	0.10	LF
				Indeterminate hardwood	Wood	3	0.10	LF
Subtotals				Nonbotanical	Soot/sediment	2	2.30	HF
						6	2.50	
41CV1206	2	Hearth	F-1	No carbonized remains	N/A	-	-	-
	3	Hearth	F-4a	Indeterminate	Wood	3	0.02	LF
Subtotals						3	0.02	
						28	3.32	-
Totals								

suggests that the two are connected functionally, with the charred plant remains representing materials accidentally charred during the cooking process. Although these macrobotanical remains have not been found extensively in archeological contexts, plant bulbs have been recovered from burned rock features at Hinds Cave (41VV456), at the Wilson Leonard site (41WM235), and at the Jonas Terrace site (41ME29) (Dering 1996).

The charred wood assemblage primarily

indicates the utilization of a riparian corridor setting, since most of the identified woods are associated with stream terraces or valley flanks. A few fragments of juniper wood were recovered from sites in the House-Ripstein Creek area, but these may represent trees situated in open strath terraces or on erosional breaks at the edge of stream valleys. Interestingly, uncharred juniper seeds were recovered from samples in every site group, suggesting that juniper has spread considerably since the sites were occupied.

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## **APPENDIX F: Fort Hood Chert Typology**

Douglas K. Boyd



This Fort Hood chert typology is a modified version of the chert taxonomy defined by researchers from Texas A&M University and Mariah Associates, Inc. Some of the early work was done by Dickens (1993a, 1993b). Chert Types 1–11 and 13–17 were formally defined by Frederick and Ringstaff (1994) and Trierweiler (1994:Appendix C); there is no Type 12. The taxonomy was further modified through the addition of Types 18–28 by Abbott and Trierweiler (1995:Appendix I). The typology defined herein is a compilation of this previous work but also incorporates comments based on observations made during the 1996 chert typology studies discussed in Chapter 11.

#### **TYPE 1: HEINER LAKE BLUE-LIGHT (HLB-LT)**

**Overall Appearance:** This chert is homogeneous to very faintly banded, is opaque, emits a distinct ring upon being struck, and is generally white to yellowish gray in color. The coarseness of this material is reminiscent of the coarse inclusions in the Heiner Lake Tan (HLT) and Fort Hood Yellow materials (FHY). The reddish color it acquires when heat treated is also characteristic of the color change noted in FHY. It is possible that this material is a coarse-grained version of these other two chert types, particularly since it occurs at the extreme southeast end of the chert-bearing Edwards Formation. Dickens (1993a:82) says that HLB-LT is not found together with the HLT variety, but rather that one is superposed over the other with the blue variety occurring at slightly higher elevations than the tan. It is interesting that HLT also occurs in the same area around Heiner Lake, and in terms of coarseness it is between the HLB-LT and the finer FHY materials. FHY occurs in the central and western portions of the Edwards Formation. The sample specimen has a relatively thin but chalky orangish brown cortex.

**Texture:** It has a medium to coarse texture, and freshly broken surfaces often feel rather chalky. This material occurs around the outside of the nodules, while the chert comprising the core of the nodule is darker in color and has a finer texture. The nodules tend to be relatively homogeneous throughout the material. Although the material retains its fairly grainy texture, it demonstrates an improvement in workability in

the mid and high temperature ranges.

**Size Range:** This material occurs in large (often greater than 1 m in diameter) disk-shaped nodules.

**Quality:** HLB-LT is a surprisingly workable material considering its grainy texture. It is easier to work during the early stage of reduction, with workability dropping to fair in the middle and late stages (secondary thinning and pressure flaking). Low-temperature heat treatment has little effect on material quality, while mid- and high-temperature treatments improve quality substantially (Frederick and Ringstaff 1994:167).

**Type Locality:** This material has been observed along the pipeline that runs roughly east-west immediately north of Heiner Lake in Quad 32/45.

#### **TYPE 2: COWHOUSE WHITE (CW)**

**Overall Appearance:** Cowhouse White chert is white or very light gray to bluish white. It is the only prominently banded chert in the existing taxonomy, and it grades to a mottled structure in the interior of large nodules. The band or bands of fine-grained translucent brownish light blue material occur immediately below the cortex but do not appear deeper in the nodules. Coarse-grained inclusions have a yellowish color which turns pinkish under heat treatment. The material is relatively flawless and opaque (Frederick and Ringstaff 1994:148). Its color is predominantly a dirty white, with occasional bands of light gray. Microscopically, there are numerous brownish "splotches" or specks throughout the material which no doubt contribute to the dirty appearance (Dickens 1993b:79).

**Texture:** It is fine- to coarse-grained and does not have the chalky surface texture of the Heiner Lake Blue-Light. The cortex is gray and ranges from thick to relatively thin and chalky. Heat-treated specimens turn a reddish pink color and acquire a slightly greater luster than specimens in their raw state.

**Size Range:** This chert occurs as large, flat, disk-shaped nodules most often found fractured

into blocky fragments, with longitudinal axes in excess of 20 cm. Complete nodules are uncommon but may be in excess of a meter in diameter and 20–30 cm thick (Frederick and Ringstaff 1994:148). It is found in both plate form and small to medium-sized flattened nodules that often are cracked and broken (Dickens 1993b:79). The majority of the nodules procured for the workability experiments were large (greater than 30 cm) and flat-ovate to more rounded (subspherical).

**Quality:** Unlike most grainy cherts, this variety can be worked very easily in its raw state. The edges and platforms are easily crushed, however, suggesting that it has less tensile strength than the other local cherts. Heat alteration has little effect other than perhaps further weakening its tensile strength. Experiments in heat altering have reached temperatures of 550°F; higher temperatures may be required before any noticeable changes occur (Dickens 1993b:79). The overall workability is rated as good, with the exception of pressure reduction, which is rated as fair (Frederick and Ringstaff 1994:168).

**Type Locality:** Material occurs on the Manning surface in the vicinity of Union Hill (Quad 38/45), north of the Cowhouse Creek arm of Belton Reservoir. The outcrop of this material appears to be restricted to the immediate vicinity of Union Hill, but similar material has been observed in Quad 16/59 cropping out from the upper slopes of the Manning surface on the south side of the Clabber Creek valley. A more extensive survey by Charles Frederick (personal communication 1995) identified a wide distribution including other portions of the Southeast Chert Province (Quads 33/44, 39/45, 37/49, and 37/50), the North Forth Chert Province (Quad 35/54), and the northern portion of the Northwest Province (Quads 10/67, 10/63, 13/68, 14/62, 14/61, 14/60, 15/59, and 16/58) contiguous with the western edge of the North Fort Chert Province.

#### **TYPE 3: ANDERSON MOUNTAIN GRAY (AMG)**

**Overall Appearance:** This chert ranges widely in color from white, pale yellowish brown, and light gray around the exteriors to medium

dark gray, olive gray, and brownish gray in the interior. Light blue fossiliferous inclusions are common in the matrix. The cortex is moderately thick and chalky and has a tan color.

**Texture:** It is often fossiliferous, is fine to medium textured, and can be best described as having a mottled structure. It is relatively opaque and has a dull luster; however, it acquires increased luster with heat treatment and also takes on a slight pinkish color.

**Size Range:** It seems to occur in disk-shaped nodules. At the bedrock source, nodules are quite variable in form, shape, and size.

**Quality:** At the bedrock source, quality was thought to be poor; most flake core removals and early biface reduction were rated poor to fair. The hardness of the material appears to make reduction difficult. Some improvement following heat treatment makes it rank as good (Frederick and Ringstaff 1994:168–169).

**Type Locality:** The type locality is Anderson Mountain in Quad 5/45 (Frederick and Ringstaff 1994:151). Charles Frederick (personal communication 1995) has identified primary outcrops of AMG in four additional locations on or around Seven Mile Mountain (Quads 7/40, 8/38, 9/36, and 10/36), although Frederick and Ringstaff (1994:151) state that it is believed to occur as far north as Henson Lake and as far south as Seven Mile Mountain.

**Comments:** Type 3 grades into and may be easily confused with Type 10 (see Chapter 11). The classic variants of Types 3 and 10 appear to be opposite ends of the spectrum of variability within a single chert type.

#### **TYPE 4: SEVEN MILE MOUNTAIN NOVACULITE (SMN)**

**Overall Appearance:** Seven Mile Mountain Novaculite displays a light gray, bluish gray, or pale blue color. It is one of the most translucent cherts in the taxonomy and often has vugs partially filled with megaquartz. The cortex is a porous, megaquartz-rich material; it often possesses a pronounced tabular fabric and is stained brownish red by the surrounding soil. In the raw state, this chert is very hard. However,

the finer-textured portions experience a radical metamorphosis after heating and often become almost vitreous in character. Often the light or pale blue matrix contains brownish orange swirls or veins that remain visible even when heat treated.

**Texture:** Typically, the texture of this chert is coarsest on the outside, fines immediately beneath the cortex, and then coarsens again toward the center of nodule. The usable portions are found in the fine-textured zone between the cortex and the nodule centers. These nodule centers often exhibit a sugary fracture surface, probably due to the presence of megaquartz, whereas the finer-textured portions have a smooth to slightly rough fracture surface and are characterized by thin, irregular, yellow to orange veins. The texture of the material improves significantly when heat treated, and it also acquires a luster that is not evident on raw specimens. The material is very hard in its raw state and appears to contain many embedded fracture lines.

**Size Range:** This chert is found in rather large (often greater than 1 m in diameter and more than 40 cm thick) rounded to tabular nodules. The nodules acquired from the bedrock source were medium to large (approximately 15 to 40 cm) in size.

**Quality:** In the raw state this chert is very hard, but the finer-textured portions experience a radical metamorphosis after heating and often become almost vitreous in character. This chert is the worst of all 15 types included in the study in terms of workability, and is rated as poor. Heat treatment considerably improves its quality to a good workable state. Under heat treatment it reacts very similarly to Arkansas Novaculite, taking on a significant degree of luster.

**Type Locality:** The type locality for this chert is Quad 7/38 on Seven Mile Mountain, but it has also been observed south of Heiner Lake. Secondary deposits of this chert are common along the valley walls of House and Clear Creeks (Frederick and Ringstaff 1994:151). A singular, probably primary outcrop was also noted by Charles Frederick (personal communication 1995) on Anderson Mountain in Quad 5/45.

#### TYPE 5: TEXAS NOVACULITE (TN)

**Overall Appearance:** It is commonly light bluish gray, white, or pale yellowish brown and medium to fine textured, coarsely mottled, and moderately translucent. This form is not a true novaculite but instead is a variety of chert. It ranges from white to light gray-brown in color and is typically found in large, thick, egg-shaped nodules. A cross section of one of these nodules reveals a darker outer color of gray to gray-brown, terminating in a dark brown ring several inches into the nodule. The interior of the nodule is a lighter gray to off-white. Unsoiled cortex has a dark red brick color.

**Texture:** This material does not appear to be as grainy as Seven Mile Mountain Novaculite, although it has some very coarse quartzite pockets. Heat-treated specimens become dark gray and lose the light pale-bluish colored portions notable on untreated specimens.

**Size Range:** The nodules collected from the bedrock sources tended to be large (15–30 cm) and subspherical.

**Quality:** In its raw state, Texas Novaculite is so hard that it is almost impossible to reduce. Samples from the bedrock source are difficult to work. Low- to mid-range heat treatment improves workability to fair/good, while high-temperature treatment results in good-quality material.

**Type Locality:** A large deposit of this type is located on top of a ridge several hundred yards west of a large Gray-Brown-Green deposit. It is known only from a small area around East Range Road in Quad 31/59.

#### TYPE 6: HEINER LAKE TAN (HLT)

**Overall Appearance:** Heiner Lake Tan is light gray, light brownish gray, white, and grayish orange in color and typically has numerous round or irregularly shaped white mottles 1–5 mm in diameter (Frederick and Ringstaff 1994:152). The tan variety is light gray to brown with light specks throughout (Dickens 1993a:82) and is opaque to moderately translucent. The cortex is a light orange color similar to a light-colored brick.

**Texture:** This chert is medium to fine textured. Some translucence is also often seen in a very thin layer beneath the cortex. Heat treatment considerably improves flaking characteristics. Some specimens become relatively dark gray, while others remain light. In both cases, however, the specimens take on a light red to pinkish appearance.

**Size Range:** Typically this variety comes in either large plates or egg-shaped nodules that may weigh up to 100 pounds or more. It occurs in dense nodular zones often more than 20 cm thick and in nodules in excess of 50 cm in diameter; it commonly breaks into blocky fragments in the outcrop.

**Quality:** In its raw state the material is easily reducible with a hammerstone during the early stage of reduction. The hardness of the material makes late stage reduction (i.e., thinning and pressure flaking) more difficult; thus, the workability of the material is ranked only fair in the middle to late stages of reduction. Heat treatment in the mid to high temperature ranges results in substantial improvement in workability, especially in the middle to late reduction stages.

**Type Locality:** A very large deposit of the tan variety is located in the area surrounding Heiner Lake; it is thought to be restricted to that area and not encountered elsewhere (Dickens 1993b:79). It has been observed in the immediate vicinity of Heiner Lake (Quad 32/45), and Charles Frederick (personal communication 1995) identified an additional primary outcrop in this vicinity (Quad 33/44). The full areal extent of HLT outcrops in the Heiner Lake area is unknown (Frederick and Ringstaff 1994:152).

#### **TYPE 7: FOSSILIFEROUS PALE BROWN (FPB)**

**Overall Appearance:** Fossiliferous Pale Brown chert occurs as large disklike nodules, irregularly shaped but bedded parallel. It ranges in color from very pale brown, light yellow, light gray, and brownish gray, to white. It occasionally has pale blue, chalcedonic, veinlike inclusions and small (less than 1 mm) pale bluish white fossils which may impart a speckled appearance. It is mottled on a coarse scale, with the color

changing abruptly from white to light yellowish brown near the nodule exterior to a brownish gray near the interior. The cortex is orangish brown.

**Texture:** This chert has a moderate- to fine-grained texture with some very coarse chalcedonic to quartzitic inclusions.

**Size Range:** No information.

**Quality:** No information; no heat treatment experiments were undertaken.

**Type Locality:** The type locality for this chert is in Quad 33/48, where it crops out at the margin of the Manning surface overlooking the Cowhouse Creek valley. Occurrences in primary contexts also are known to exist in Quads 16/51, 31/50, and 34/51 (Frederick and Ringstaff 1994:152) and Quads 16/58, 30/47, 31/51, and 34/51 (Charles Frederick, personal communication 1995).

#### **TYPE 8: FORT HOOD YELLOW (FHY)**

**Overall Appearance:** Fort Hood Yellow is very pale brown to yellow in color and often has light gray mottles which are slightly coarser than the matrix. It is opaque, has a medium to dull luster, and is generally fine textured. It occasionally has voids or chalky mottles in the nodule interiors. FHY ranges from a solid light yellow to darker shades and occurs in large irregular nodules. The cortex is not nearly as chalky as Heiner Lake Tan (HLT); it is relatively thin and has a tan color.

**Texture:** Although FHY is similar in appearance to HLT, the light gray inclusions in FHY are more fine grained. Heat-treated specimens take on a pinkish red and/or pinkish orange tone that is more noticeable than for HLT specimens. The interior of the material becomes glossy and fine textured and can be easily reduced.

**Quality:** The material is relatively soft and easily reducible, even in its raw state. However, it improves significantly when heat treated. FHY is one of the most workable materials on the installation. The only problems presented by this material are the presence of chalky voids often not detectable through visual examination and

abrupt texture changes which were most often gray in color.

**Size Range:** The nodules collected from the bedrock source areas were quite variable in size (10–40 cm) and form (flat to subrounded to amorphous).

**Type Locality:** Dickens's (1993b:78) type locality is on Henson Mountain near the headwaters of Owl Creek inside the Live Fire Area. A large deposit of this type is located on some ridges overlooking Owl Creek near the north-eastern boundary of the post (North Fort Chert Province, Quads 29/60 and 30/58). It is most commonly seen in nodular form, but many of the nodules are cracked into small fragments. Similar material has been observed adjacent to East Range Road in Quad 25/63 and north of Royalty Ridge Road in Quads 17/67 and 17/68 (Frederick and Ringstaff 1994:152). An isolated outcrop also was noted in the northern portion of the West Range Chert Province, Quad 15/63 (Charles Frederick, personal communication 1995). It is about 6 m long and is relatively homogeneous throughout. While FHY is common in the north-western and central portion of the North Fort Chert province, HLT occurs in the southeastern portion of the same chert province and in the Southeast Chert Province immediately south of the southern portion of the North Fort Province. This spatial distribution suggests some connection between the two, perhaps a northwest to southeast grading of FHY into the coarser HLT as one moves across the base.

#### **TYPE 9: HEINER LAKE TRANSLUCENT BROWN (HLTB)**

**Overall Appearance:** This chert occurs in rounded blocky to tabular nodules and is dark gray or dark grayish brown to pale yellowish brown in color. It has striations which are often evident on the exterior of the nodule and act as cleavage planes. The cortex is thin, not chalky, and ranges in color from milky white to orangish brown. In addition to the banding, the inside of the material commonly has opaque white to yellowish brown rectangular mottles. It is fairly translucent and exhibits a dull luster which changes significantly upon heating, when the material darkens to a dark gray. Some of the white striations take on a light blue appearance

when heat treated.

**Texture:** It is fine textured, although the striations are coarse grained and similar in texture to the coarse-grained inclusions in a number of the other chert types from the installation. Where these striations are long and continuous, the material is difficult to knap if the flake removals are not oriented parallel to these bands.

**Size Range:** No systematic information was collected, but blocky nodules of various sizes have been noted while visiting the type locality.

**Quality:** The material between the coarse-grained striations appears to be of fine texture and good quality. This fine-grained band can range from 1 to 6 cm in thickness. It is difficult to flake these nodules across the striations. Workability improves substantially under high-temperature heat treatment, but changes in quality are less notable under lower-temperature treatment.

**Type Locality:** HLTB occurs in Quad 32/44 around Heiner Lake but also is known to occur as far as 5 km west of the lake. Its actual areal extent is unknown (Frederick and Ringstaff 1994:152).

#### **TYPE 10: HEINER LAKE BLUE (HLB)**

**Overall Appearance:** This is one of the two cherts in the project area that appears to be all blue (the other being Seven Mile Mountain Novaculite). It has a light to dark grayish appearance with a light bluish tinge. It has linear and spotty light bluish inclusions and light gray coarse-grained inclusions similar to those noted in some of the other Fort Hood materials. HLB has a thin, chalky cortex. Heat-treated specimens acquire a darker color and have a brown tinge. Frederick and Ringstaff (1994:173) note that HLB and Heiner Lake Blue-Light (HLB-LT) are often found together in the same nodule, with the main differences being that HLB is finer grained and harder than HLB-LT. Cortex color and texture are similar to HLB-LT, and HLB-LT's texture is similar to the portion of the HLB material immediately below the cortex.

**Texture:** The material is medium to fine grained with light gray inclusions that are

relatively coarse grained in texture. The portion of the raw material immediately under the cortex is coarser grained than the deeper material.

**Size Range:** The bedrock sources contain large disk-shaped nodules (30–60 cm in diameter) and fractured blocky nodule fragments.

**Quality:** HLB is difficult to reduce in its raw state due to fossil inclusions, abrupt changes in texture, and material hardness. While early reduction flaking can be carried out with less difficulty, biface thinning and pressure flaking of raw HLB is very difficult. Material quality and workability improve to good under high-temperature heat treatment (Frederick and Ringstaff 1994:165, 173–174).

**Type Locality:** HLB is named after a type of chert reported by J. B. Sollberger to be present in the vicinity of Heiner Lake. It occurs north of Heiner Lake in Quad 32/45, but its areal extent is otherwise unknown (Frederick and Ringstaff 1994:152–153). Dickens (1993b:79) mentions that HLB is found mixed with Heiner Lake Tan, is quite restricted in its range, and is not very abundant.

**Comments:** Type 10 grades into and may be easily confused with Type 3 (see Chapter 11). The classic variants of Types 3 and 10 appear to be opposite ends of the spectrum of variability within a single chert type.

#### **TYPE 11: EAST RANGE FLAT (ERF)**

**Overall Appearance:** This chert occurs as irregularly shaped nodules that often have voids or chalky inclusions. It is opaque and finely to coarsely mottled and ranges in color from gray or light gray to light olive gray, becoming olive green toward the center. The same nodule often contains gray portions adjacent to light olive green sections, with both portions containing dark olive green specks that give it a freckled appearance. The cortex is thin but chalky and has a tan to brownish color.

**Texture:** It has a chalky feel, medium texture, and a very dull appearance. Heat treatment gives the material a strong luster but does not darken the material. However, the dark

green specks become less noticeable in the heat-treated specimens.

**Size Range:** No information.

**Quality:** The material has a slight chalky feel with only small, somewhat banded portions of the material having a fine texture. Frederick and Ringstaff (1994:174) indicate that flakes were easily removed from the cores but that many of the flakes had voids in them. The material improves once the portion with voids is reduced. However, the inner portion of the material is of poor quality in places, and the chalky portions lead to hinged removals. Material quality does not improve substantially upon low-temperature heat treatment, but substantial improvements are notable under mid- to high-temperature treatment.

**Type Locality:** It occurs in several canyons cut into the Owl Creek Mountains forming the southern valley wall of Owl Creek and the Leon River. The type locality for this chert is located on the north- and east- facing slopes of the Manning surface, southeast of the confluence of Preacher Creek and Owl Creek in Quad 36/56.

#### **TYPE 13: EAST RANGE FLECKED (ER FLECKED)**

**Overall Appearance:** This chert is dark gray to light gray and contains numerous small white flecks. The flecking is extremely heavy and grades to darker colors in nodule interiors. The cortex is chalky white and thin, somewhat reminiscent of the chalky cortex on Georgetown flint. The darkest colors of this material overlap with Owl Creek Black, but the flecking is much more pronounced than for that material.

**Texture:** It is medium to fine textured and opaque and has a medium to dull luster. Heat treatment considerably increases the luster.

**Size Range:** It consists of thin, often fractured nodules. Specimens from bedrock sources were procured in tabular forms varying in thickness from 1 to 10 cm.

**Quality:** In its raw state, the material is rated only fair in quality. Material hardness makes biface thinning and pressure flaking very

difficult. Heat treatment showed marked improvement in workability, especially in the mid and high temperature ranges.

**Type Locality:** ER Flecked occurs in a relatively small outcrop located in East Range overlooking the Leon River portion of Belton Reservoir in Quad 41/48.

#### **TYPE 14: FORT HOOD GRAY (FHG)**

**Overall Appearance:** Fort Hood Gray occurs as irregular nodules. It ranges in color from light to dark gray, and occasionally bluish gray. It is mottled in appearance, and some light gray to bluish coarse-grained inclusions of irregular shape are present. FHG has a dull to medium luster and it occasionally has chalky mottles or voids. It is generally uniform in color but may vary due to slight mottling of light and dark shades. This type occurs in the upper drainage area of Owl Creek in the form of thick "amoeba-shaped" nodules which come in a multitude of shapes and sizes. These nodules may be cylindrical or have small projections stemming from the main body in many directions. The cortex is relatively thick and chalky and is of a light gray to brownish color. The FHG nodules procured for the workability assessment often graded in color to the Gray-Brown-Green (GBG) material.

**Texture:** It is minimally translucent and fine textured. Heat treatment considerably increases luster and changes the surface color of the material to a pinkish shade, which ultimately changes to a deeper red by the end of the heat-treatment process.

**Size Range:** FHG occurs in large, irregular nodules.

**Quality:** The quality of the material, even in its raw state, is rated as good in all stages of biface manufacture. Heat treatment improves workability at all temperature ranges, but the material can be easily worked without treatment.

**Type Locality:** It is known to crop out stratigraphically above GBG and grades into that material. Its occurrence beyond Quad 31/60 is unknown. Deposits of this type vary. Some

have been observed eroding out from below the crest of a small hill, while in another area, large, very dark nodules were found eroding directly from limestone visible in the bottom of a drainage ditch that paralleled one of the post roads (Dickens 1993b:78).

**Comments:** Some variants of Type 14 are indistinguishable from Type 15 (see Chapter 11). The classic variants of Types 14 and 15 are quite distinctive, but the two types grade into each other.

#### **TYPE 15: GRAY-BROWN-GREEN (GBG)**

**Overall Appearance:** This is the most varied form encountered at Fort Hood. Its color ranges from gray-brown mottled, light brown to dark brown mottled, brown-green mottled, light olive gray to very dark gray mottled, and light green to dark green mottled. Some nodules contain bands of tough, grainy chert. Some nodules may be almost solid in any of the colors represented. It is similar to Fort Hood Yellow and Fort Hood Gray (FHG) in color, texture, chalky voids, and workability. GBG crops out below FHG and is also composed of irregularly shaped nodules, often in excess of 50 cm in diameter.

**Texture:** GBG has a fine texture, is opaque, and exhibits a medium to dull luster. Some chalky portions of the matrix are coarse grained, but most of the material is fine to medium grained. Heat treatment seems to improve the material, even for the coarse-grained inclusions.

**Size Range:** Many of the nodules weigh as much as 30 to 40 pounds.

**Quality:** After heat treatment this form is very easy to reduce, allowing production of a thinner biface than would be possible otherwise. However, the material in its raw state is also very easily worked, with the exception of those nodules containing very grainy textures and inclusions.

**Type Locality:** GBG is known to occur in Quad 30/60 and elsewhere in the eastern part of the post, but beyond that its distribution is unknown. Two large deposits were encountered, one eroding from the crest of a hill in the

northern Owl Creek drainage area and the other about a kilometer farther north. A large quarry site in the Henson Mountains region contained small but distinct deposits of FHG intermixed within GBG mottled deposits. This suggests that there may be a close relationship between these two varieties (Dickens 1993b:78).

**Comments:** Some variants of Type 15 are indistinguishable from Type 14 (see Chapter 11). The classic variants of Types 14 and 15 are quite distinctive, but the two types grade into each other.

#### **TYPE 16: LEONA PARK (LP)**

**Overall Appearance:** This chert is mottled dark gray to very light gray and has a pronounced horizontal fabric which is reminiscent of lenticular bedding. It is opaque and has a dull luster.

**Texture:** LP has a fine to medium texture with a slight chalky feel on some specimens. It has rounded to oval coarse inclusions and the texture is highly variable. There is no significant cortex on this material. It emits a strong petroleum odor upon breakage after heating.

**Size Range:** LP is a bedded chert with a thickness in excess of 50 cm in some places.

**Quality:** The workability of raw LP blocky nodules is rated as fair to poor. Heat treatment, especially at high temperatures, considerably improves the material.

**Type Locality:** LP occurs outside of Fort Hood on the east side of the Leon River arm of Belton Reservoir north of State Highway 36.

#### **TYPE 17: OWL CREEK BLACK (OCB)**

**Overall Appearance:** This chert ranges in color from black to dark gray and occasionally has elongated light gray mottles. It often has many very fine flecks oriented parallel to the long axis of the nodule. It is fine grained in texture. Light gray to light bluish mottles are common, as are coarse-grained light gray inclusions similar to those found in other materials.

**Texture:** It is opaque and has a medium to

shiny luster and fine texture. The cortex can vary from white to tannish brown to orangish brown, and is rather chalky and thick. Heat treatment increases the luster of the material and imparts a light pink color to the cortex; it reduces the grayness of the material, while increasing the black background.

**Size Range:** No information.

**Quality:** It is currently one of the more widely preferred cherts in the region and may have been so in the prehistoric past as well. OCB can be used in the raw without heat treatment. In fact, heat treatment at high temperatures may fracture the material.

**Type Locality:** The name of this chert suggests that it occurs in the Owl Creek basin, and Dickens (1993b:77) notes that it is a common constituent of Preachers Creek bedload. A bed-rock source for this material is located in the Preacher Creek drainage basin, north of Fort Hood in Quad 36/60; it is suspected that OCB crops out on the base as well. If so, the most likely outcrop areas would be on the divide between Owl and Henson Creeks in training areas 63 and 64 in the Live Fire Area. At present, the major known deposit occurs in Owl Creek near the eastern boundary of Fort Hood. However, some caprock deposits have been reported. Some problem identifying the exact source of this type exists, as black cherts are also known to occur near the town of Flat and in the Leon River area, both located north of Fort Hood. The material coming from Flat can often be identified by the presence of pyrites and is primarily known from stream deposits. However, the material from the Leon River is virtually identical to the Owl Creek deposits. It is presently known from a small deposit varying several inches in thickness that is eroding from the caprock.

#### **TYPE 18: COWHOUSE TWO TONE (CTT)**

**Overall Appearance:** This is a two-tone chert characterized by a light gray to brownish gray color around the cobble exterior and a dark gray to somewhat purple center. A brownish tone is evident immediately below the cortex, which ranges from yellowish brown to light brown. Portions of some specimens have a light to dark



gray mottled appearance at the transition between the exterior and interior of the nodule. Faint yellowish veins distributed through the material can be seen in some specimens.

**Texture:** CTT textures range from fine to medium with some coarse-grained inclusions. In general, specimens not heat treated are dull and exhibit little luster.

**Size Range:** No information.

**Type Locality:** It is the most common chert in the Cowhouse Creek bedload, accounting for more than half of the materials sampled by Abbott and Trierweiler (1995:I-8).

**Comments:** There appears to be too much variability represented in Type 18, and it does not appear to be a valid type (see Chapter 11). No "classic" variant of this chert type exists.

#### **TYPE 19: COWHOUSE DARK GRAY (CDG)**

**Overall Appearance:** Cowhouse Dark Gray nodules range in color from relatively even dark gray interiors to moderately dark and very dark mottled specimens somewhat reminiscent of a gray version of Gray-Brown-Green (GBG). Both varieties contain numerous light gray to light blue fossiliferous inclusions and 1–3-mm quartz pockets. The evenly dark gray nodules have a very light blue to pale brown band ranging from 5 to 10 mm in thickness immediately below the cortex, which is brown. The mottled specimens have only a very faint light brown tint immediately below the thin (1 mm) brown cortex.

**Texture:** The specimens have fine to medium texture with some mottled specimens reminiscent of the quality of GBG and the dark gray material similar to Owl Creek Black. Some moderately gray portions of the mottled variety tend to be medium to coarse grained. The light blue to pale brown band around the exterior of the evenly dark variety also tends to be medium to coarse grained. The unheated matrix is dull.

**Size Range:** No information.

**Type Locality:** CDG is found in a gravel

bar in the active channel of Cowhouse Creek, immediately adjacent to the western edge of Fort Hood (Quad 6/61).

**Comments:** Type 19 is very similar to Chert Types 17 and 14/15, and does not appear to be a valid type (see Chapter 11).

#### **TYPE 20: COWHOUSE SHELL HASH (CSH)**

**Overall Appearance:** This chert's matrix is light gray to white with yellowish brown overtones. It contains abundant arcuate-shaped, pale bluish to white shell fragments, with some shell having been replaced by lustrous translucent brown sparry calcite. The cortex is dark brown and ranges from very thin to 3–5 mm thick and chalky.

**Texture:** The medium-grained matrix coupled with the sparry calcite pockets make this a difficult material to work.

**Size Range:** No information.

**Type Locality:** The type definition is based on a single nodule, suggesting that the type is not an abundant element of the Cowhouse Creek bedload. It is found in a gravel bar in the active channel of Cowhouse Creek, immediately adjacent to the western edge of Fort Hood (Quad 6/61).

#### **TYPE 21: COWHOUSE LIGHT GRAY (CLG)**

**Overall Appearance:** Cowhouse Light Gray chert is a light gray to yellowish gray color with a yellowish tint dominant immediately below the cortex. It has very faint light bluish to white inclusions throughout the matrix. Some lustrous quartzite pockets are also evident. The dark brown cortex ranges from very thin to 3–5 mm thick and chalky.

**Texture:** CLG has a medium-grained texture and a dull appearance.

**Size Range:** No information.

**Type Locality:** CLG is found in a gravel bar in the active channel of Cowhouse Creek, adjacent to the western edge of Fort Hood.

**TYPE 22: COWHOUSE MOTTLED  
WITH FLECKS (CMF)**

**Overall Appearance:** The matrix color ranges from light gray to brownish gray with moderately dark gray pockets and nodule interiors. The change in color tends to parallel the cortex. Some mottling of the brownish gray and dark gray colors occurs at the juncture of the two. Yellowish brown color dominates immediately below the cortex. Perhaps the most diagnostic attribute of this chert is the presence of numerous small (1–3 mm) round to irregular-shaped white to light gray flecks that are usually more concentrated near the exterior of the nodule and more coarse grained than the surrounding matrix. Some flakes removed from near the outer surface of the nodules can resemble Heiner Lake Tan (HLT) in appearance except when more heavily speckled than HLT. The cortex is yellowish brown to dark brown and usually thin, with the chalky cortex not reaching thicknesses greater than 2 to 3 mm.

**Texture:** Both brownish gray and dark gray portions of the matrix are fine grained with flecked inclusions ranging from medium to coarse grained.

**Size Range:** No information.

**Type Locality:** CMF is found in a gravel bar in the active channel of Cowhouse Creek, immediately adjacent to the western edge of Fort Hood (Quad 6/61).

**Comments:** Type 22 is nearly identical to Type 6 and may not be valid as a separate type (see Chapter 11).

**TYPE 23: COWHOUSE BANDED AND  
MOTTLED (CBM)**

**Overall Appearance:** Cowhouse Banded and Mottled is a two-tone chert dominated by a light and dark gray matrix. These shades of gray are not bedded throughout the nodules but might occur either near the nodule's exterior or interior. Some banding of light and dark gray tones can be seen in both the light and dark gray matrix, respectively, and at their junction. Small (<5 mm) light blue and whitish inclusions are common, while reddish brown specks are scarce.

A yellowish brown band of chalky material occurs immediately below the cortex. Alternate banding of light and dark brown colors can sometimes be seen here as well. The cortex of CBM ranges from very thin and dark grayish brown to a somewhat thicker (2–3 mm), chalkier cortex that is lighter brown in color. The chert is very similar in appearance to Cowhouse Two Tone (CTT) but exhibits banding that is not present in the nodules used to characterize CTT. CBM has a grayer tone than the more brownish gray matrix of CTT.

**Texture:** Both light and dark gray portions of the matrix are fine grained. The chalky exterior of the nodules is medium to coarse grained.

**Size Range:** No information.

**Type Locality:** CBM is found in a gravel bar in the active channel of Cowhouse Creek, immediately adjacent to the western edge of Fort Hood (Quad 6/61).

**Comments:** There appears to be too much variability represented in Type 23, and it does not appear to be a valid type (see Chapter 11). No "classic" variant of this chert type exists.

**TYPE 24: COWHOUSE FOSSILIFEROUS  
LIGHT BROWN (CFLB)**

**Overall Appearance:** The matrix ranges from light bluish gray to light brownish (yellowish) gray and consists primarily of shell fragments replaced by chalcedony. Yellowish veins extend throughout the material. Immediately below the cortex the material has a tan to brownish gray color, while within the interior of the nodules the matrix takes on a distinctly bluish gray color. The cortex is brown and thin. This chert is somewhat reminiscent of Texas Novaculite; however, the individual constituent shell fragments are much more numerous and more clearly identifiable in CFLB.

**Texture:** The texture ranges from medium to fine grained, although most specimens have a medium-grained texture derived from the original sediments.

**Size Range:** No information.

**Type Locality:** CFLB is located in channel

gravels from Cowhouse Creek near the west edge of Fort Hood (Quad 6/61).

**Comments:** Type 24 is very similar to Types 4, 5, and 27 and may not be valid (see Chapter 11).

**TYPE 25: COWHOUSE BROWN  
FLECKED (CBF)**

**Overall Appearance:** The matrix of CBF has a light brownish gray color with occasional diffuse-edged, reddish brown splotches. The most diagnostic attribute is the presence of numerous small (1–2 mm), spherical to tubular white inclusions which are distributed randomly throughout the material. Occasional light bluish inclusions are also present in the matrix, as are scarce medium-grained quartz inclusions. The cortex is yellowish brown and ranges from thin to chalky. The chalky portion that penetrates the material is white and may be as thick as 3 mm.

**Texture:** CBF is fine grained and somewhat reminiscent of Fort Hood Yellow. The inclusions are small and do not appear to diminish raw material texture. In its original state the material has a faint luster probably derived from its fine texture.

**Size Range:** No information.

**Type Locality:** CBF is found in channel gravels from Cowhouse Creek, adjacent to the western edge of Fort Hood (Quad 6/61).

**TYPE 26: COWHOUSE  
STREAKED (CS)**

**Overall Appearance:** The base matrix of this chert is pale gray to bluish gray with dark gray, pale brown, and dark brown streaks often formed by varying proportions of very small dark brown flecks. A few light gray to bluish coarse-grained inclusions are also present in the matrix. The material has a yellowish brown appearance immediately below the cortex. The cortex is yellowish brown and ranges from thin (1 mm) to somewhat thicker (2–3 mm) and chalky.

**Texture:** CS has medium- to fine-grained texture with a dull luster.

**Size Range:** No information.

**Type Locality:** CS is found in a gravel bar in the active channel of Cowhouse Creek, adjacent to the western edge of Fort Hood (Quad 6/61).

**TYPE 27: COWHOUSE  
NOVACULITE (CN)**

**Overall Appearance:** This chert ranges from light gray to light bluish gray, with light brownish gray often found in the same nodule. It often contains small (1 mm) dark brown to black specks throughout the matrix. The cortex is very light brown to light gray and ranges from thin (1 mm) to slightly thicker (2–3 mm) and chalky. The color of the matrix is similar to Texas Novaculite (TN); however, CN is significantly coarser grained than TN.

**Texture:** CN is medium to coarse grained and dull.

**Size Range:** No information.

**Type Locality:** CN is found in a gravel bar in the active channel of Cowhouse Creek, adjacent to the western edge of Fort Hood (Quad 6/61).

**Comments:** Type 27 is very similar to Types 4, 5, and 24 and may not be a valid type (see Chapter 11).

**TYPE 28: TABLE ROCK FLAT (TRF)**

**Overall Appearance:** The most common color in the matrix of TRF is light gray which grades into pale brown, yellowish brown, and even brownish yellow near the corticate exterior of the nodule. Gray to dark gray veins are often found near the exterior of some nodules. A few coarse-grained gray to dark gray mottles with abrupt edges occur near the centers of nodules. The cortex ranges from light yellowish brown to white and from relatively thin (1–2 mm) to thicker (3–5 mm) and chalky. Small pieces of this material are similar to both Heiner Lake Tan (HLT) and Cowhouse Mottled with Flecks (CMF). In particular, portions of the base matrix where inclusions are scarce have the same color range and texture as these two other chert types. However, the chalky cortex of HLT is reddish orange compared with the light

yellowish brown to almost white cortex of TRF. Sufficiently large flakes of CMF can be separated from TRF specimens due to the numerous small to medium-sized white to very light gray flecks present in CMF but absent in TRF.

**Texture:** The majority of this chert type is medium to fine grained, but there is variation even within the same nodule, with exterior portions being coarse grained while the nodule's interior is fine grained.

**Size Range:** The few specimens collected by Abbott and Trierweiler (1995:I-12) were

judged almost too small to reduce effectively.

**Type Locality:** TRF is located in the bedload of Table Rock Creek adjacent to where it enters Fort Hood (Quad 3/55). Abbott and Trierweiler (1995:I-12) state that it was the only chert observed in the bedload of the creek, comprising less than 1 percent of chert in the deposits.

**Comments:** There appears to be too much variability represented in Type 28, and it does not appear to be a valid type (see Chapter 11). No "classic" variant of this chert type exists.

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**APPENDIX G: Metric and Nonmetric Attributes  
for Projectile Points**

Table 116. Metric and nonmetric attributes for projectile points

Site-Subarea	Accession Number	Specimen Number	Analysis Unit	Test Unit	Level	Elevation (cms)	Backhoe Trench	Feature Association	Other Provenience*	Point Type	Chert Type**	Maximum Length (mm)	Blade Length (mm)	Blade Width (mm)	Haft Length (mm)	Neck Width (mm)	Base Width (mm)	Maximum Thickness (mm)
ARROW POINTS																		
41CV1043	8	1	1	2	2	-	-	-	-	untypeable arrow point	ind. light blue	16.5	0.0	0.0	0.0	0.0	0.0	2.1
41CV1049	15	1	1	1	2	-	-	-	-	Scallorn	ind. light blue	17.8	0.0	0.0	7.5	5.4	8.2	3.3
41CV1143	11	1	1	3	1	-	-	-	-	untyped arrow point	FHY	18.8	0.0	0.0	5.2	6.7	7.4	2.9
41CV1191	64	1	1	1	3	20-30	-	-	-	Scallorn	HLT	37.9	29.9	19.8	8.0	10.9	13.2	4.6
41CV1191	17	1	1	1	5	-	-	-	-	Scallorn	ind. light blue	14.1	0.0	18.0	4.9	6.6	0.0	3.7
41CV1191	17	2	1	1	5	-	-	-	-	untypeable arrow point	ind. light blue	15.4	0.0	0.0	0.0	0.0	0.0	2.6
41CV1211	11	1	1	2	5	-	-	-	-	Scallorn	CW	21.6	11.5	0.0	10.1	7.0	10.8	3.5
41CV1250	13	4	1	1	-	70-78	-	4	-	Scallorn	ind. light blue	19.3	0.0	15.4	6.9	6.6	9.8	3.7
41CV1250	12	1	1	1	-	55	-	4	-	Clifton	FHY	39.5	33.9	21.4	5.6	7.3	4.7	4.0
41CV1269	116	2	3	4	3	-	-	2	-	untypeable arrow point	OCB	22.9	0.0	0.0	0.0	0.0	0.0	3.2
41CV1269	110	2	3	-	-	-	-	2?	F	Alba	ind. light blue	26.0	20.9	0.0	5.1	6.1	6.7	3.9
41CV1286	26	4	1	10	2	-	-	2	-	untypeable arrow point	FHY	16.1	0.0	0.0	0.0	0.0	0.0	3.1
DART POINTS																		
41V0578	59	1	1	4	10	-	-	-	-	untypeable dart point	FHY	9.8	0.0	0.0	0.0	0.0	0.0	2.8
41V0578	29	1	2	1	-	129	-	-	-	untypeable dart point	FHY	14.4	0.0	0.0	0.0	0.0	0.0	3.8
41V0578	45	1	2	3	3	-	-	-	-	Darl	GBG	45.6	0.0	19.9	15.3	14.6	16.9	18.5
41V0578	33	2	3	2	3	-	-	-	-	Pedernales	AMG	61.3	0.0	0.0	18.6	17.3	14.3	8.8
41V0578	38	1	3	2	7	-	-	-	-	Darl	ind. light blue	40.6	27.6	20.9	13.0	18.3	17.9	7.8
41V0578	15	1	3	-	-	-	4	-	F	Baird	ind. nonlocal	49.7	30.5	35.5	14.2	30.5	30.5	8.0
41V0578	16	1	3	-	-	-	4	-	F	untyped dart point	ER-FL	67.3	52.2	24.8	15.1	12.2	14.3	9.6
41V0578	17	1	3	-	-	48	4	-	B	Darl	ind. light gray	40.0	0.0	20.6	15.1	16.9	17.0	5.6
41V0755	18	1	1	2	6	-	-	-	-	untypeable dart point	ind. light gray	18.8	0.0	0.0	0.0	0.0	0.0	6.6
41V0947	31	1	1	2	2	-	-	-	-	untypeable dart point	ind. light blue	22.6	0.0	0.0	12.2	0.0	0.0	7.0
41V0957	15	1	1	-	-	-	-	-	S	Zephyr	FHG	68.7	52.2	26.5	16.5	18.6	17.7	6.8
41V0957	16	1	1	-	-	6	1	-	B	Pedernales	FHY	54.4	37.6	0.0	16.8	18.9	17.1	8.6
41V0984	13	1	1	3	3	-	-	-	-	untypeable dart point	FHY	19.6	0.0	0.0	0.0	0.0	0.0	3.2
41V0984	5	1	1	-	-	-	-	-	S	Ellis	ind. light blue	25.3	0.0	24.9	9.4	14.3	17.9	6.0

Table 116, continued

Site-Subarea	Accession Number	Specimen Number	Analysis Unit	Test Unit	Level	Elevation (cmbs)	Backhoe Trench	Feature Association	Other Provenience*	Point Type	Chert Type**	Maximum Length (mm)	Blade Length (mm)	Blade Width (mm)	Haft Length (mm)	Neck Width (mm)	Base Width (mm)	Maximum Thickness (mm)
DART POINTS, continued																		
41V0988	6	1	1	1	-	22	-	2A	-	Darl	FHY	35.8	25.3	17.1	10.5	14.0	13.8	6.2
41V0988	4	1	1	1	2	-	-	-	-	Darl	HLTB	23.5	0.0	17.8	11.6	14.4	16.5	5.5
41V0988	9	1	1	2	-	20	-	-	-	Darl	FHY	47.3	36.2	20.9	11.1	12.9	14.9	7.1
41V0988	7	1	1	2	1	-	-	-	-	untypeable dart point	AMG	18.4	0.0	0.0	0.0	0.0	0.0	5.2
41V0988	14	1	1	4	-	19	-	-	-	untypeable dart point	CDG	33.7	0.0	0.0	9.3	20.2	0.0	5.7
41V0988	13	1	1	4	2	-	-	-	-	Ensor	FHY	58.7	49.9	19.2	8.8	14.1	19.6	6.1
41V0988	20	1	1	5	5	-	-	-	-	untypeable dart point	FHY	14.9	0.0	0.0	0.0	0.0	0.0	2.9
41V0988	32	1	1	8	-	41	-	-	-	Edgewood	OCB	33.9	0.0	0.0	8.3	15.9	0.0	5.8
41V0988	1	2	1	-	-	-	-	-	S	untypeable dart point	CDG	34.2	0.0	23.0	0.0	14.8	0.0	6.1
41V1043	7	1	1	-	-	-	-	1	S	Ensor	ind. white	29.5	0.0	24.9	7.6	21.2	0.0	5.4
41V1049	30	1	1	3	1	-	-	-	-	Pedernales	HLT	46.8	27.5	25.8	19.3	19.2	18.5	6.8
41V1049	31	1	1	3	2	-	-	-	-	Darl	ind. light brown	36.8	0.0	20.3	12.3	13.9	15.1	5.7
41V1050	15	1	1	2	2	-	-	-	-	Darl	CDG	27.7	19.9	16.0	7.8	12.6	0.0	4.9
41V1050	17	1	1	-	-	-	-	3	S	Godley	ind. dark brown	51.7	39.3	16.6	12.4	11.1	13.9	6.7
41V1092	13	3	1	1	3	-	-	2	-	untypeable dart point	ind. light brown	12.4	0.0	0.0	0.0	0.0	0.0	5.4
41V1092	15	1	1	2	2	-	-	-	-	untypeable dart point	ind. light brown	25.4	0.0	0.0	0.0	0.0	0.0	5.9
41V1093	22	1	1	3	2	-	-	-	-	untypeable dart point	GBG	31.3	0.0	0.0	0.0	0.0	0.0	7.3
41V1106	8	1	1	1	1	-	-	1	-	Pedernales	ind. light blue	40.5	0.0	0.0	21.5	19.7	19.2	8.0
41V1106	7	1	1	-	-	-	-	-	S	Ensor	ind. light blue	55.2	46.1	30.7	9.1	21.2	0.0	6.3
41V1120	53	1	1	3	10	-	-	-	-	Pedernales	ind. light gray	17.0	0.0	0.0	0.0	0.0	22.3	6.9
41V1120	11	1	1	-	-	20	1	-	B	Castroville	ind. light gray	64.3	0.0	0.0	12.2	21.0	22.8	8.3
41V1120	10	1	1	-	-	0-50	1	-	F	Pedernales	ind. light blue	43.6	0.0	40.1	15.1	19.6	17.5	7.2
41V1122	13	1	0	-	-	-	1	-	F	Pedernales	HLB	55.5	0.0	26.2	18.5	17.1	18.8	8.6
41V1122	14	1	0	-	-	-	2	-	F	Pedernales	FHY	39.8	0.0	32.9	19.7	22.3	0.0	9.8
41V1122	19	1	1	1	5	-	-	-	-	Pedernales	ind. white	45.4	0.0	0.0	11.8	0.0	23.7	7.9
41V1122	19	2	1	1	5	-	-	-	-	Castroville	AMG	41.3	0.0	0.0	11.4	21.6	23.6	7.8
41V1122	20	1	1	1	6	-	-	-	-	Pedernales	ind. light blue	73.3	52.3	25.7	21.0	0.0	0.0	9.1
41V1122	43	1	1	2	6	-	-	2	-	Pedernales	FHG	45.4	0.0	29.2	17.0	15.5	0.0	9.6

Table 116, continued

Site-Subarea	Accession Number	Specimen Number	Analysis Unit	Test Unit	Level	Elevation (cms)	Backhoe Trench	Feature Association	Other Provenience*	Point Type	Chert Type**	Maximum Length (mm)	Blade Length (mm)	Blade Width (mm)	Haft Length (mm)	Neck Width (mm)	Base Width (mm)	Maximum Thickness (mm)
DART POINTS, continued																		
41V1122	24	1	2	1	9	-	-	-	-	untypeable dart point	ind. light blue	43.9	0.0	0.0	0.0	0.0	0.0	7.8
41V1122	49	1	2	2	-	100-129	-	4	-	untypeable dart point	HLTB	36.1	0.0	0.0	0.0	0.0	0.0	4.5
41V1133	24	1	1	1	7	-	-	1	-	Pedernales	GBG	55.7	0.0	0.0	25.5	19.6	15.7	8.5
41V1133	35	1	1	2	7	-	-	-	-	untyped dart point	ind. dark brown	12.5	0.0	0.0	0.0	0.0	22.8	6.3
41V1133	39	1	1	3	1	-	-	1	-	untyped dart point	ER-FL	26.4	0.0	0.0	8.7	16.2	0.0	6.5
41V1133	50	1	1	4	5	-	-	-	-	Untyped Group 1	ind. light gray	40.4	0.0	29.7	20.6	14.2	17.7	8.2
41V1133	17	1	1	-	-	-	1	1?	F	Bulverde	FHY	57.4	39.3	27.0	18.1	18.3	16.2	7.8
41V1133	17	2	1	-	-	-	1	1?	F	Pedernales	FHY	70.0	49.0	27.6	21.0	17.4	19.9	8.6
41V1138	20	1	1	1	7	-	-	-	-	untypeable dart point	HLTB	43.3	33.0	27.0	0.0	19.8	0.0	6.9
41V1138	33	1	1	4	1	-	-	-	-	untypeable dart point	HLTB	39.5	0.0	0.0	0.0	0.0	0.0	8.2
41V1138	48	1	1	-	-	-	-	-	S	Castroville	FHY	57.9	0.0	30.8	9.2	15.2	0.0	6.8
41V1138	48	2	1	-	-	-	-	-	S	Ensor	ind. white	33.6	0.0	16.7	8.5	14.9	0.0	5.6
41V1138	15	1	1	-	-	-	-	-	S	Ensor	HLTB	30.9	0.0	0.0	7.4	22.1	24.4	5.9
41V1138	15	2	1	-	-	-	-	-	S	Edgewood	ind. dark brown	37.0	0.0	0.0	0.0	0.0	0.0	4.1
41V1191	29	1	1	2	-	21	-	-	-	Ensor	HLT	41.0	0.0	18.7	9.6	12.6	0.0	5.0
41V1191	27	4	1	2	2/3	-	-	-	-	untypeable dart point	ind. light blue	24.7	0.0	0.0	0.0	0.0	0.0	4.3
41V1191	28	1	1	2	3	-	-	-	-	Darl	OCB	35.7	24.0	19.1	11.7	14.9	14.5	6.4
41V1191	33	1	1	2	5	-	-	-	-	untypeable dart point	AMG	45.3	0.0	0.0	0.0	0.0	0.0	6.5
41V1191	43	1	1	3	-	23	-	-	-	Darl	HLTB	54.5	43.0	16.3	11.5	15.1	15.5	6.4
41V1191	47	1	1	3	-	38	-	-	-	Darl	ind. light blue	33.5	0.0	0.0	11.3	12.7	12.5	5.4
41V1191	41	1	1	3	2	-	-	-	-	untypeable dart point	HLB	45.4	0.0	0.0	0.0	0.0	0.0	6.2
41V1191	20	1	2	1	8	-	-	-	-	Pedernales	FHY	62.6	0.0	28.3	18.3	17.5	17.9	7.9
41V1191	21	1	2	1	9	-	-	-	-	Dawson	ind. light blue	58.8	45.5	25.8	13.3	12.5	9.3	7.3
41V1191	54	1	2	4	2	-	-	1	-	Pedernales	ind. light blue	55.5	37.5	22.2	18.0	18.7	19.0	8.7
41V1191	55	1	2	4	3	-	-	1	-	Provisional Type 1	ind. dark brown	45.2	0.0	20.2	16.1	14.2	14.2	7.5
41V1211	23	1	1	4	7	-	-	-	-	untypeable dart point	ind. light blue	15.7	0.0	0.0	0.0	0.0	0.0	4.4
41V1218	2	1	1	-	-	-	-	-	S	Zephyr	FHY	33.8	0.0	0.0	12.4	16.2	16.7	5.8



Table 116, continued

Site-Subarea	Accession Number	Specimen Number	Analysis Unit	Test Unit	Level	Elevation (cms)	Backhoe Trench	Feature Association	Other Provenience*	Point Type	Chert Type**	Maximum Length (mm)	Blade Length (mm)	Blade Width (mm)	Haft Length (mm)	Neck Width (mm)	Base Width (mm)	Maximum Thickness (mm)
DART POINTS, continued																		
41V1218	1	1	1	1	1	1	1	1	S	Victoria	ind. light blue	76.8	60.5	24.0	16.3	14.7	14.9	8.0
41V1219	28	1	1	4	1	87	1	1	1	untyped dart point	ind. light blue	45.6	0.0	23.7	20.5	21.7	20.1	7.7
41V1219	13	1	1	1	1	1	1	1	S	Gower	ind. dark brown	42.1	0.0	23.8	15.6	12.4	0.0	6.6
41V1221	31	1	2	1	1	16	1	1	1	Provisional Type 1	ind. light blue	62.9	50.0	24.9	12.9	13.2	13.7	8.2
41V1221	39	2	2	3	2	1	1	1	1	untypeable dart point	ind. dark brown	16.5	0.0	0.0	0.0	0.0	0.0	4.4
41V1221	39	1	2	3	2	1	1	1	1	untypeable dart point	ind. dark brown	13.2	0.0	0.0	0.0	0.0	0.0	3.6
41V1221	28	1	2	1	1	1	1	1	S	Castroville	ind. dark brown	24.4	0.0	0.0	0.0	0.0	26.3	7.5
41V1222	19	0	2	3	2	1	1	1	1	Pedernales	ind. white	45.5	0.0	0.0	10.9	0.0	22.8	8.1
41V1225	28	1	0	1	1	1	1	1	S	Pedernales	GBG	75.0	58.2	25.4	16.8	17.5	17.8	8.3
41V1235	37	1	1	1	3	1	1	1	1	Montell	AMG	47.8	0.0	0.0	0.0	0.0	0.0	7.2
41V1235	42	1	1	1	7	1	1	1	1	Provisional Type 1	ind. light blue	33.5	0.0	19.1	14.7	11.2	12.7	7.4
41V1235	56	1	1	2	1	39	1	1	1	Pedernales	AMG	57.6	0.0	26.3	18.2	18.3	15.0	10.3
41V1235	55	1	1	2	4	1	1	1	1	untyped dart point	FHG	18.5	0.0	0.0	0.0	15.9	16.2	6.8
41V1235	118	1	1	4	1	55-60	1	8	1	untypeable dart point	ind. light blue	11.1	0.0	0.0	0.0	0.0	0.0	2.5
41V1235	87	1	1	4	7	1	1	8	1	untypeable dart point	ind. light blue	8.0	0.0	0.0	0.0	0.0	0.0	2.6
41V1235	96	1	1	5	1	44-68	1	4	1	Gower	HLB	39.7	22.3	24.2	0.0	17.7	0.0	7.8
41V1235	97	2	1	5	1	44-68	1	4	1	unttypeable dart point	ind. light blue	19.6	0.0	0.0	0.0	0.0	0.0	3.3
41V1235	92	1	1	5	2	1	1	1	1	Castroville	ind. light blue	22.2	0.0	0.0	13.6	16.7	0.0	6.6
41V1235	103	5	1	1	1	1	1	1	F	unttypeable dart point	AMG	74.0	0.0	0.0	0.0	22.1	0.0	5.8
41V1235	105	1	1	1	1	42	5	1	B	Pedernales	ind. nonlocal	75.0	0.0	33.9	20.2	17.2	17.7	8.2
41V1235	103	6	1	1	1	1	4	1	F	Pedernales	LP	57.2	38.2	23.5	19.0	16.0	16.0	7.3
41V1235	48	1	2	1	1	105	1	1	1	Dawson	HLTB	64.5	45.5	18.9	19.0	12.6	13.6	7.6
41V1235	67	1	2	2	1	95	1	1	1	Travis	ind. light blue	69.1	55.2	23.1	13.9	17.0	17.6	11.9
41V1235	65	1	2	2	1	90	1	1	1	Provisional Type 1	ind. light blue	84.2	69.2	17.5	15.0	12.9	14.6	8.7
41V1235	63	1	2	2	1	76	1	1	1	Provisional Type 1	FHY	49.2	32.2	21.1	17.0	14.6	15.8	9.3
41V1235	62	2	2	2	8	1	1	1	1	Provisional Type 1	FHY	48.6	34.6	18.0	14.9	13.0	13.5	6.5
41V1235	62	1	2	2	8	1	1	1	1	Travis	AMG	67.0	54.7	19.2	12.3	13.9	0.0	9.3

Table 116, continued

Site-Subarea	Accession Number	Specimen Number	Analysis Unit	Test Unit	Level	Elevation (cms)	Backhoe Trench	Feature Association	Other Provenience*	Point Type	Chert Type**	Maximum Length (mm)	Blade Length (mm)	Blade Width (mm)	Haft Length (mm)	Neck Width (mm)	Base Width (mm)	Maximum Thickness (mm)
DART POINTS, continued																		
41V1235	62	3	2	2	8	-	-	-	-	Provisional Type 1	GBG	29.0	0.0	24.0	14.0	13.9	14.4	6.4
41V1235	64	1	2	2	9	-	-	-	-	Provisional Type 1	AMG	47.8	31.5	18.6	16.3	14.5	14.4	7.2
41V1235	64	2	2	2	9	-	-	-	-	Provisional Type 1	CDG	13.8	0.0	0.0	0.0	14.4	15.7	6.3
41V1235	108	1	2	3	-	171-176	-	3	-	Pedernales	HLTB	59.6	42.4	22.6	17.2	15.3	16.8	7.8
41V1235	106	1	2	-	-	101	5	-	B	Dawson	ind. light blue	55.8	38.8	21.3	17.0	11.9	11.0	7.8
41V1269	50	4	0	-	-	-	2	1?	F	Castroville	ind. light gray	48.9	0.0	35.1	12.0	17.7	19.7	6.4
41V1269	105	2	0	-	-	-	2	1?	F	Ensor	FHG	38.4	28.2	23.0	10.2	17.3	23.6	7.1
41V1269	50	3	0	-	-	-	2	1?	F	Pedernales	HLTB	70.9	0.0	28.0	0.0	17.7	0.0	8.1
41V1269	50	1	0	-	-	-	2	1?	F	Castroville	ind. light blue	83.0	0.0	0.0	12.7	21.1	23.0	9.1
41V1269	105	3	0	-	-	-	2	1?	F	Pedernales	AMG	64.4	45.3	30.1	19.1	15.4	16.8	8.5
41V1269	50	8	0	-	-	-	2	1?	F	Castroville	GBG	27.2	0.0	30.8	11.9	22.2	24.7	6.8
41V1269	50	7	0	-	-	-	2	1?	F	Marshall	ind. dark brown	30.6	0.0	31.3	13.0	19.7	22.9	7.5
41V1269	50	6	0	-	-	-	2	1?	F	Castroville	AMG	42.1	0.0	29.9	11.6	18.0	20.2	6.2
41V1269	50	9	0	-	-	-	2	1?	F	Marshall	ind. dark brown	28.6	0.0	0.0	10.4	17.8	19.8	7.0
41V1269	50	2	0	-	-	-	2	1?	F	Marshall	ind. light blue	80.9	66.7	0.0	13.5	16.5	19.5	9.3
41V1269	50	5	0	-	-	-	2	1?	F	Montell	AMG	42.4	0.0	0.0	10.4	21.7	23.3	7.4
41V1269	105	4	0	-	-	-	2	1?	F	untypeable dart point	HLTB	61.7	56.3	33.2	0.0	19.4	0.0	6.8
41V1269	51	1	0	-	-	-	2	1?	F	Pedernales	ind. light blue	62.3	0.0	23.4	14.8	16.6	17.9	7.5
41V1269	51	2	0	-	-	-	2	1?	F	Marshall	AMG	41.8	0.0	41.3	16.0	17.2	17.5	7.1
41V1269	63	1	2	1	-	118	-	1	-	Pedernales	HLTB	50.8	0.0	0.0	19.7	18.1	18.8	7.2
41V1269	74	1	2	2	19	-	-	-	-	Pedernales	ind. light blue	61.9	0.0	0.0	20.7	18.3	17.4	8.8
41V1269	99	1	2	3	-	247	-	-	-	Provisional Type 1	AMG	61.2	48.1	17.0	13.1	12.5	15.5	8.0
41V1269	97	1	2	3	24	-	-	-	-	Travis	ind. light blue	72.6	0.0	26.1	15.4	18.7	18.6	7.3
41V1269	116	1	3	4	3	-	-	2	-	untypeable dart point	ind. red	60.0	0.0	0.0	0.0	0.0	0.0	7.3
41V1269	118	1	3	4	5	-	-	2	-	Castroville	AMG	48.3	0.0	42.1	12.7	17.8	20.1	8.3
41V1269	119	1	3	4	6	-	-	2	-	untypeable dart point	ind. light blue	19.0	0.0	0.0	0.0	0.0	0.0	3.9
41V1269	119	3	3	4	6	-	-	2	-	untypeable dart point	ind. light blue	26.5	0.0	0.0	0.0	0.0	0.0	5.8

Table 116, continued

Site-Subarea	Accession Number	Specimen Number	Analysis Unit	Test Unit	Level	Elevation (cms)	Backhoe Trench	Feature Association	Other Provenience*	Point Type	Chert Type**	Maximum Length (mm)	Blade Length (mm)	Blade Width (mm)	Haft Length (mm)	Neck Width (mm)	Base Width (mm)	Maximum Thickness (mm)
DART POINTS, continued																		
41V1269	119	4	3	4	6	-	-	2	-	untypeable dart point	ind. light blue	15.0	0.0	0.0	0.0	0.0	0.0	6.2
41V1269	110	1	3	-	-	-	-	2?	F	Edgewood	OCB	18.2	0.0	22.7	8.1	17.8	18.5	4.5
41V1269	111	1	3	-	-	-	7	2?	F	Marcos	ind. light gray	57.0	46.3	0.0	10.7	17.9	25.2	7.6
41V1269	112	1	3	-	-	-	7	2?	F	Edgewood	AMG	32.8	0.0	24.8	11.4	14.6	20.2	6.5
41V1275	146	1	3	9	-	69	-	-	-	Hoxie	ind. white	71.4	0.0	20.1	17.3	17.0	0.0	7.5
41V1275	140	1	3	9	2	-	-	-	-	Axtell	AMG	34.2	0.0	21.9	17.0	14.6	18.3	7.4
41V1275	145	1	3	9	7	-	-	-	-	Golondrina	ind. light gray	29.1	0.0	0.0	24.8	28.4	30.9	7.3
41V1275	172	1	3	-	-	-	-	-	S	Hoxie	ind. light blue	42.3	0.0	17.7	22.0	16.6	16.4	6.7
41V1275	104	1	4	3	3	-	-	-	-	untypeable dart point	ind. light blue	17.1	0.0	0.0	0.0	0.0	0.0	5.1
41V1275	111	1	4	4	-	39	-	-	-	Travis	ind. light blue	70.0	0.0	30.5	19.4	16.3	13.9	10.1
41V1275	110	2	4	4	4	-	-	-	-	Travis	ind. light blue	47.3	0.0	25.1	11.0	18.6	17.3	8.3
41V1275	110	1	4	4	4	-	-	-	-	untyped dart point	ind. light blue	47.4	36.5	25.8	10.9	19.1	20.8	7.4
41V1275	113	1	4	4	6	-	-	-	-	Bulverde	ind. light blue	57.2	0.0	29.6	16.8	18.6	15.7	7.0
41V1275	122	1	4	6	2	-	-	-	-	Ensor	ind. light brown	39.8	0.0	20.7	10.2	14.3	0.0	6.4
41V1275	130	2	4	8	1	-	-	-	-	untypeable dart point	ind. light brown	24.2	0.0	0.0	0.0	0.0	0.0	4.1
41V1275	130	1	4	8	1	-	-	-	-	untypeable dart point	ind. light brown	12.5	0.0	0.0	0.0	0.0	0.0	4.7
41V1275	133	1	4	8	4	-	-	-	-	Godley	ind. light gray	54.2	0.0	16.3	16.5	12.2	13.6	7.1
41V1275	135	1	4	8	6	-	-	-	-	Untyped Group 1	ind. light brown	38.3	0.0	0.0	18.2	14.0	17.6	8.2
41V1275	136	1	4	8	7	-	-	-	-	untypeable dart point	ind. light brown	41.7	0.0	0.0	0.0	0.0	0.0	7.0
41V1283	26	3	1	10	2	-	-	2	-	Provisional Type 1	HLT	37.3	0.0	23.1	19.4	14.3	14.2	7.8
41V1283	20	1	1	-	-	-	-	-	S	untyped dart point	ind. light brown	39.7	22.7	23.3	17.0	14.7	10.1	9.1
41V1287	30	1	1	4	1	-	-	-	-	untypeable dart point	ind. light brown	24.9	0.0	0.0	0.0	0.0	0.0	5.7
41V1287	32	1	1	4	3	-	-	-	-	Pedernales	ER-FL	23.8	0.0	28.5	12.8	19.7	20.6	7.6

\*Abbreviations for Other Provenience column:

S = surface collection

F = fill from backhoe trench

B = backhoe trench wall, in situ

? = feature association is not absolutely certain

\*\*ind. = indeterminate